



GAIL FARBER, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
<http://dpw.lacounty.gov>

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

January 25, 2011

IN REPLY PLEASE

REFER TO FILE:

WW-1

TO: Each Supervisor

FROM: Gail Farber *Gail Farber*
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

On November 5, 2008, your Board directed the Department of Public Works to conduct a public outreach effort in the Antelope Valley to present information on available disinfection options to meet a new Federal drinking water standard for trihalomethanes (THMs) and report back to your Board within 120 days (see Attachment 1).

On March 11, 2009, we reported back to your Board with the results of our public outreach effort and advantages and disadvantages of two disinfection options: (1) chloramines (a combination of chlorine and ammonia) and (2) granular-activated carbon (GAC) and chlorine, to meet the new Federal drinking water standard for THMs. We also recommended to your Board that we discuss with the Antelope Valley-East Kern Water Agency (AVEK), the wholesale water agency that supplies State Water Project water to the Los Angeles County Waterworks District Nos. 37, Acton, and 40, Antelope Valley (Districts), the use of the GAC and chlorine option. Your Board approved the recommendation and directed Public Works to report back to your Board with an implementation action plan within 120 days (see Attachment 2).

On August 5, 2009, we reported back to your Board with a summary of a study conducted by an AVEK consultant on the GAC and chlorine option and its impact on customers' water rates. Along with the report, we proposed an implementation action plan that recommended holding community meetings to discuss construction and operation costs of the needed facilities to implement the GAC and chlorine option and a customer opinion survey to verify the customers' preferred disinfection option (see Attachment 3).

In December 2009, four community meetings, facilitated by a professional consultant, were held in Acton, Lancaster, Palmdale, and Lake Los Angeles to discuss the implementation of the GAC and chlorine disinfection option. Also, in April 2010, a phone survey of 440 District customers was conducted by Fairbank, Maslin, Maullin, Metz & Associates, a public opinion research and strategy firm that has been in business for over 20 years, to assess customers' opinions of the two available disinfection options.

Based on the information reported in the previous Board memos, the study prepared by AVEK's consultant on the GAC and chlorine option, and customers' input from the community meetings and phone survey, we conducted a comprehensive analysis following the American Public Works Association's Framework for Sustainable Communities (Sustainability Analysis). The Analysis assesses the impacts of the two disinfection options in the areas of ecology, economy, empowerment, efficiency, and health. Projects and services with high value rating in these five areas are considered sustainable in meeting community needs. Following is a summary of the analysis.

- **Chloramines option** - was rated high in value in the areas of ecology, economy, and efficiency due to its low carbon footprint in the environment, low implementation cost, high effectiveness in meeting the THM standard, and widespread and well-understood application. It has risk in the empowerment area because the majority of survey respondents favored the GAC and chlorine option over the chloramines option (56 percent prefer GAC with chlorine and 31 percent prefer chloramines). However, the survey also indicates that 65 percent of respondents changed their selection at least once during the course of the survey and 6 percent of respondents were consistently undecided. These results indicate that over 70 percent of the respondents are persuadable on either one of the options. Details of the survey results are included in Attachment 4.
- **GAC and chlorine option** - was rated high in value in the empowerment area because the majority of the survey respondents favor the GAC and chlorine option over the chloramines option. However, it has risks in the ecology and economy areas because it would produce a large amount of carbon dioxide and substantially increase customers' water bills, respectively.

The complete analysis is included in Attachment 5

Recommendation

We recommend making the results of the Sustainability Analysis and customers' opinion survey available to AVEK's Board of Directors without any specific recommendation of a disinfection method. As is the case in all water treatment decisions, AVEK's Board of Directors should choose the disinfection option it believes most suitable to comply with regulatory drinking water standards.

AA:kk
MEMO111

Attach.

cc: Chief Executive Office (Rita Robinson)
County Counsel
Executive Office



MINUTES OF THE BOARD OF SUPERVISORS COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Sachi A. Hamal, Executive Officer-
Clerk of the Board of Supervisors
383 Kenneth Hahn Hall of Administration
Los Angeles, California 90012

At its meeting held Wednesday, November 5, 2008, the Board took the following action:

70-A

The following statement was entered into the record for Supervisor Antonovich:

"In 2005 the Antelope Valley East Kern Water Agency's ('AVEK') staff recommended to its Board of Directors to switch the disinfection of treated water at its treatment plants from chlorine to chloramines. This action was a result of a new drinking water standard imposed by the United States Environmental Protection Agency and the State of California. Given the new standard, chlorine is no longer a viable method of disinfection.

"The use of chloramines for disinfection of water has been in use throughout the United States. While utilized by other water agencies in California, chloramine treatment has never been used in the Antelope Valley. For example, the Littlerock Irrigation District, Palmdale Water District, Quartz Hill Water Company, and the Rosamond Community Standards District have always utilized alternatives to chloramines.

"In its deliberations, AVEK consulted with its larger customers, which includes the Los Angeles County Waterworks District 40. Although County staff supported the decision to convert to chloramine disinfection, staff did not notify customers in advance, nor did the District conduct any public outreach.

"Many residents in Antelope Valley have expressed concerns about chloramine treatment. These include concerns about potential allergic reactions, harmful affects to pets, degradation of infrastructure, and impacts upon residential septic systems. These issues should be considered before chloramine treatment is implemented. Waterworks District 40 staff should hold community meetings throughout the Antelope Valley to solicit input, answer questions, and address the public's concerns about chloramine disinfection."

(Continued on Page 2)

70-A (Continued)

Therefore, on motion of Supervisor Antonovich, seconded by Supervisor Molina, unanimously carried (Supervisor Yaroslavsky being absent), the Acting Director of Public Works was directed to take the following actions:

1. Immediately postpone the implementation of chloramine treatment by County Waterworks District 40 for a minimum of 120 days;
2. Coordinate with Antelope Valley East Kern Water Agency's staff on this action;
3. Conduct a public outreach effort that includes hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water service bills to District customers; and
4. Report back to the Board within 120 days with a recommendation.

07110508_70-A

Copies distributed:

Each Supervisor
Chief Executive Officer
County Counsel
Acting Director of Public Works

Attachment 2



GAIL FARBER, Director

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

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IN REPLY PLEASE

REFER TO FILE: **WW-0**
A2952

March 11, 2009

TO: Each Supervisor *Gail Farber*
FROM: Gail Farber
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A
PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

Recommendations

1. Initiate discussions with the Antelope Valley-East Kern Water Agency on the use of granular activated carbon (GAC) and chlorine for its treatment plants instead of chloramines to comply with the new regulatory standards for trihalomethanes (THMs).
2. Report back to your Board with an implementation action plan within 120 days.

Background

On November 5, 2008, your Board directed Public Works to conduct a public outreach effort (including hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water bills to the Waterworks Districts' customers) and report back to your Board within 120 days.

The following is a report describing the public outreach effort and summarizing the feedback received from the community meetings.

Public Outreach Effort

Community meetings were conducted in Acton, Lancaster, Palmdale, and Lake Los Angeles in late January. Presentations by the Los Angeles County Waterworks Districts' staff covered the following topics:

- Regulatory Requirements - The regulatory requirement to disinfect drinking water to protect the public's health and safety from potential microbial contamination.
- Health Effects - The health effects of THMs, known carcinogens, and by-products of the disinfection of drinking water with chlorine.
- Disinfection Options - The two applicable disinfection options identified by a study conducted for the Antelope Valley-East Kern Water Agency by a private engineering consultant in 2005 that were discussed are:
 1. Chloramines - Use of chloramines (a combination of chlorine and ammonia), instead of the currently used chlorine for disinfection.
 2. Granular Activated Carbon - Use of GAC filters to remove organic materials that produce THMs when chlorine is used to disinfect the water.
- Advantages and Disadvantages - The advantages and disadvantages of available disinfection options to comply with newly enacted, more stringent water quality standards for THMs (see attached).

In addition to the community meetings, the following public education actions were completed:

- Included educational materials in the Districts' Fall Splash newsletter sent to all customers with their bills.
- Presented to the Palmdale Chamber of Commerce on November 19, 2009, that included an interview with the local television station.
- Provided information to the Antelope Valley Press for an article published on January 23, 2009.
- Conducted a telephone interview with Jim Crockett for the Agua Dulce/Rosamond/Lake Los Angeles News.

- Responded to numerous correspondences and emails and provided the individuals with information related to chloramines.

Meeting Attendees - There were 206 community members who signed the attendance sheet. The majority of the attendees favored the use of GAC and chlorine disinfection.

Following are the most frequently raised concerns regarding the use of chloramines for drinking water disinfection.

- Skin rashes and respiratory problems that are purportedly attributed to the use of water disinfected with chloramines.
- Effects on fish and amphibians. The ammonia in chloraminated water is harmful to fish and amphibians if not removed.
- Leaching of lead and copper from household plumbing. Water that is disinfected with chloramines could result in more leaching of lead and copper from household plumbing than with chlorine.
- Contamination of groundwater with nitrate. The ammonia from chloraminated water, used to irrigate landscaping, could contaminate the groundwater basin.
- Formation of yet-to-be-regulated disinfection by-products. The potential for harmful disinfection by-products from the use of chloramines.
- Removal of chloramines from water. The cost to remove chloramines using home treatment systems.

These concerns are not unique to the residents of Acton and the Antelope Valley and have been extensively investigated and addressed by the Federal Environmental Protection Agency, the State Department of Public Health, and other reputable organizations.

Each Supervisor
March 11, 2009
Page 4

Conclusion

The current chlorine disinfection of the water in Los Angeles County Waterworks District Nos. 40, Antelope Valley, and 37, Acton, has to be changed to meet new, more stringent water quality requirements. There are two disinfection options being considered, each has its own technical advantages and disadvantages. Both options will result in an increase in the cost of water to the Districts' 55,000 customers and will be subject to Proposition 218 notification requirements.

We held community meetings in Acton, Lancaster, Palmdale, and Lake Los Angeles to solicit feedback on the two options. The majority of the meeting attendees favored the use of GAC and chlorine disinfection.

Before implementation of GAC, we need to work with the Antelope Valley-East Kern Water Agency to resolve any technical issues to ensure the safety of the treated water. GAC does not remove bromide salt, prevalent in State Water Project water during dry periods, and it has not been used in a large scale filtration plant for the control of THMs. Recently, the Palmdale Water District started using GAC and is still making adjustments to its system to ensure safety standards are met. We also want to carefully monitor GAC filtration costs since the cost of the materials has increased almost 133 percent in the last five years.

DWP:dvt
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Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office

ADVANTAGES AND DISADVANTAGES OF DISINFECTION OPTIONS

March 11, 2009

1. **Chloramines** – Use of chloramines, a combination of chlorine and ammonia, instead of the currently used chlorine for disinfection. Chloramines do not produce THMs when they are used to disinfect water.

Advantages	Disadvantages
Low levels of THMs are formed.	There is a potential for the growth of bacteria through a process called "nitrification" if the distribution system is not adequately maintained.
Chloramines are likely to form less THMs in the distribution system and last longer, which helps prevent the growth of bacteria.	Chloramines can be harmful to fish and amphibians if a water conditioner is not used.
Most people report better taste and odor for chloraminated water as compared to chlorinated water.	Kidney dialysis equipment must be modified to remove chloramines.
Use of chloramines will modestly increase customers' water bills by 5% to 16%, depending on water usage.	Use of chloramines could cause more lead and copper leaching in household plumbing than chlorine if corrosion control practices are not followed.

Communities in California using Chloramines: Agoura Hills, Anaheim, Antioch, Beverly Hills, Brentwood, Burbank, Burlingame, Calabasas, Corona, El Segundo, Glendale, Goleta, Hidden Hills, Irvine, Lake Elsinore, Livermore, Long Beach, Malibu, Manhattan Beach, Martinez, Murietta, Newport Beach, Norco, Oakland, Orange, Palo Alto, Pasadena, Pittsburgh, Pleasanton, Redwood City, Riverside, San Bruno, San Diego, San Francisco, Santa Ana, Santa Barbara, Santa Clara, Santa Clarita, Santa Maria, Santa Monica, Temecula, Topanga, Tustin, Val Verde, Ventura, and Westlake Village.

2. **Granular Activated Carbon** – Use of GAC filters removes organic materials that produce THMs when chlorine is used to disinfect the water.

Advantages	Disadvantages
It removes organic materials and, as a result, produces low levels of THMs and, overall, potentially better water quality.	Use of GAC will increase customers' water bills by 28% to 96%, depending on water use.
Most people report better taste and odor due to removal of organic materials from the water.	GAC does not remove bromide salt (prevalent in State Water Project water particularly during dry periods), which forms THMs when chlorine is used for disinfection. Additionally, because GAC does not remove all of the organic materials from water, THMs will continue to be formed in the distribution system.
	The need for frequent GAC replacement could impact treatment plant operations and production capacity.

Agencies in California using GAC: There are presently two agencies in California using GAC, and they are Crestline-Lake Arrowhead Water Agency and Palmdale Water Agency.

Attachment 3



GAIL FARBER, Director

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August 5, 2009

IN REPLY PLEASE

REFER TO FILE: **WW-1**

TO: Each Supervisor

FROM: Gail Farber *Gail Farber*
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A IMPLEMENTATION ACTION PLAN FOR THE USE OF GRANULAR-ACTIVATED CARBON AND CHLORINE

Background

On November 5, 2008, your Board directed the Department of Public Works to conduct a public outreach effort throughout the Antelope Valley to present information on available disinfection options to meet a new Federal drinking water standard for trihalomethanes (THMs) and report back to your Board within 120 days.

On March 11, 2009, we reported back to your Board with the results of our public outreach effort and made a recommendation, based on community input, that we initiate discussions with the Districts' wholesale water agency, the Antelope Valley-East Kern Water Agency (AVEK), on the use of granular-activated carbon (GAC) and chlorine to comply with the new THM standard. Your Board approved the recommendation and directed Public Works to report back to your Board with an implementation action plan within 120 days (see attached).

We initiated discussions with AVEK and, on April 15, 2009, AVEK's General Manager requested his consultant, MWH Consulting Engineers, to prepare a report analyzing impacts of implementation of GAC treatment at AVEK's treatment plants (copy attached).

Following is a summary of AVEK's report of impacts, the financial impacts of GAC treatment implementation on your Board's customers, and recommended implementation steps for your consideration.

Summary of AVEK Report Regarding Impacts of GAC Implementation

AVEK reports that implementation of GAC treatment and chlorine disinfection can be effectively incorporated into the existing AVEK treatment plants and will produce water meeting Federal drinking water standards for THM. The implementation of the treatment would require major capital improvements to AVEK's existing facilities. The estimated capital improvement cost of GAC treatment facilities is approximately \$70 million, and the estimated annual operation and maintenance cost is \$18 million. The timeline for completion of the improvements is estimated to be 36 to 42 months.

AVEK estimates the wholesale water rates it charges retail agencies will increase from \$325 per acre foot to \$595 per acre foot due to the capital improvement costs and ongoing maintenance and operation associated with GAC treatment.

Financial Impact to Waterworks Districts 37 (Acton) and 40 (Antelope Valley) Customers

The increase in AVEK wholesale water rates due to the implementation of GAC treatment would result in a recommendation that your Board consider a rate increase for both Districts 37 and 40. The estimated bimonthly rate increase is \$53 (46 percent) in Waterworks District 37 and \$38 (51 percent) in Waterworks District 40. This would result in an increase in current average bimonthly water bill from \$116 to \$169 in District 37 and from \$75 to \$113 in District 40.

Implementation Action Steps

1. Conduct a customer outreach effort, including public meetings, informational fliers and a survey to inform customers of the results of the AVEK report regarding the implementation of GAC treatment, the associated potential rate increases to customers of Waterworks Districts 37 and 40 and to verify the customers preferred method of treatment.
2. Report back to your Board and recommend a preferred treatment method for THM based on the results of customer outreach.

Each Supervisor
August 5, 2009
Page 3

3. Report your customers' preference, along with the other retail water agencies to AVEK for their use in determining which treatment method for THM they will implement.

AA:kk
H:\WWW\HOME\KKAJ\2009\Each Supv Memos\GAC TM Memo_rev.doc

Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office



GAIL FARBER, Director

COUNTY OF LOS ANGELES

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March 11, 2009

TO: Each Supervisor *Gail Farber*
FROM: Gail Farber
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

Recommendations

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 1. **Chloramines** - Use of chloramines (a combination of chlorine and ammonia), instead of the currently used chlorine for disinfection.
 2. **Granular Activated Carbon** - Use of GAC filters to remove organic materials that produce THMs when chlorine is used to disinfect the water.
- **Advantages and Disadvantages** - The advantages and disadvantages of available disinfection options to comply with newly enacted, more stringent water quality standards for THMs (see attached).

In addition to the community meetings, the following public education actions were completed:

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Each Supervisor
March 11, 2009
Page 3

- Responded to numerous correspondences and emails and provided the individuals with information related to chloramines.

Meeting Attendees - There were 206 community members who signed the attendance sheet. The majority of the attendees favored the use of GAC and chlorine disinfection.

Following are the most frequently raised concerns regarding the use of chloramines for drinking water disinfection.

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- Leaching of lead and copper from household plumbing. Water that is disinfected with chloramines could result in more leaching of lead and copper from household plumbing than with chlorine.
- Contamination of groundwater with nitrate. The ammonia from chloraminated water, used to irrigate landscaping, could contaminate the groundwater basin.
- Formation of yet-to-be-regulated disinfection by-products. The potential for harmful disinfection by-products from the use of chloramines.
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These concerns are not unique to the residents of Acton and the Antelope Valley and have been extensively investigated and addressed by the Federal Environmental Protection Agency, the State Department of Public Health, and other reputable organizations.

Each Supervisor
March 11, 2009
Page 4

Conclusion

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We held community meetings in Acton, Lancaster, Palmdale, and Lake Los Angeles to solicit feedback on the two options. The majority of the meeting attendees favored the use of GAC and chlorine disinfection.

Before implementation of GAC, we need to work with the Antelope Valley-East Kern Water Agency to resolve any technical issues to ensure the safety of the treated water. GAC does not remove bromide salt, prevalent in State Water Project water during dry periods, and it has not been used in a large scale filtration plant for the control of THMs. Recently, the Palmdale Water District started using GAC and is still making adjustments to its system to ensure safety standards are met. We also want to carefully monitor GAC filtration costs since the cost of the materials has increased almost 133 percent in the last five years.

DWP:dvt

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Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office

ADVANTAGES AND DISADVANTAGES OF DISINFECTION OPTIONS

March 11, 2009

1. **Chloramines** – Use of chloramines, a combination of chlorine and ammonia, instead of the currently used chlorine for disinfection. Chloramines do not produce THMs when they are used to disinfect water.

Advantages	Disadvantages
Low levels of THMs are formed.	There is a potential for the growth of bacteria through a process called "nitrification" if the distribution system is not adequately maintained.
Chloramines are likely to form less THMs in the distribution system and last longer, which helps prevent the growth of bacteria.	Chloramines can be harmful to fish and amphibians if a water conditioner is not used.
Most people report better taste and odor for chloraminated water as compared to chlorinated water.	Kidney dialysis equipment must be modified to remove chloramines.
Use of chloramines will modestly increase customers' water bills by 5% to 16%, depending on water usage.	Use of chloramines could cause more lead and copper leaching in household plumbing than chlorine if corrosion control practices are not followed.

Communities in California using Chloramines: Agoura Hills, Anaheim, Antioch, Beverly Hills, Brentwood, Burbank, Burlingame, Calabasas, Corona, El Segundo, Glendale, Goleta, Hidden Hills, Irvine, Lake Elsinore, Livermore, Long Beach, Malibu, Manhattan Beach, Martinez, Murieta, Newport Beach, Norco, Oakland, Orange, Palo Alto, Pasadena, Pittsburgh, Pleasanton, Redwood City, Riverside, San Bruno, San Diego, San Francisco, Santa Ana, Santa Barbara, Santa Clara, Santa Clarita, Santa Maria, Santa Monica, Temecula, Topanga, Tustin, Val Verde, Ventura, and Westlake Village.

2. **Granular Activated Carbon** – Use of GAC filters removes organic materials that produce THMs when chlorine is used to disinfect the water.

Advantages	Disadvantages
It removes organic materials and, as a result, produces low levels of THMs and, overall, potentially better water quality.	Use of GAC will increase customers' water bills by 28% to 96%, depending on water use.
Most people report better taste and odor due to removal of organic materials from the water.	GAC does not remove bromide salt (prevalent in State Water Project water particularly during dry periods), which forms THMs when chlorine is used for disinfection. Additionally, because GAC does not remove all of the organic materials from water, THMs will continue to be formed in the distribution system.
	The need for frequent GAC replacement could impact treatment plant operations and production capacity.

Agencies in California using GAC: There are presently two agencies in California using GAC, and they are Crestline-Lake Arrowhead Water Agency and Palmdale Water Agency.



MINUTES OF THE BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Sachi A. Hamai, Executive Officer-
Clerk of the Board of Supervisors
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"The use of chloramines for disinfection of water has been in use throughout the United States. While utilized by other water agencies in California, chloramine treatment has never been used in the Antelope Valley. For example, the Littlerock Irrigation District, Palmdale Water District, Quartz Hill Water Company, and the Rosamond Community Standards District have always utilized alternatives to chloramines.

"In its deliberations, AVEK consulted with its larger customers, which includes the Los Angeles County Waterworks District 40. Although County staff supported the decision to convert to chloramine disinfection, staff did not notify customers in advance, nor did the District conduct any public outreach.

"Many residents in Antelope Valley have expressed concerns about chloramine treatment. These include concerns about potential allergic reactions, harmful affects to pets, degradation of infrastructure, and impacts upon residential septic systems. These issues should be considered before chloramine treatment is implemented. Waterworks District 40 staff should hold community meetings throughout the Antelope Valley to solicit input, answer questions, and address the public's concerns about chloramine disinfection."

(Continued on Page 2)

70-A (Continued)

Therefore, on motion of Supervisor Antonovich, seconded by Supervisor Molina, unanimously carried (Supervisor Yaroslavsky being absent), the Acting Director of Public Works was directed to take the following actions:

1. Immediately postpone the implementation of chloramine treatment by County Waterworks District 40 for a minimum of 120 days;
2. Coordinate with Antelope Valley East Kern Water Agency's staff on this action;
3. Conduct a public outreach effort that includes hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water service bills to District customers; and
4. Report back to the Board within 120 days with a recommendation.

07110508_70-A

Copies distributed:

Each Supervisor
Chief Executive Officer
County Counsel
Acting Director of Public Works

TECHNICAL MEMORANDUM



MWH

To: Russell Fuller
From: Jim Borchardt
Subject: GAC Alternatives for AVEK

Date: June 10, 2009

File:

Granular Activated Carbon (GAC) has been discussed as an alternate treatment process to monochloramines for control of disinfection by-products (DBP) at the Antelope Valley-East Kern Water Agency (AVEK) surface water treatment plants. AVEK has planned and built facilities to utilize monochloramine to control formation of DBPs such as total trihalomethanes (TTHMs) and haloacetic acids (HAA5). However, concerns expressed by some customers regarding the use of monochloramines have resulted in the request to more fully document the GAC alternative.

This memorandum presents the MWH investigation on the use of GAC for the control of DBPs, including the development of conceptual cost estimates for incorporating this process into the AVEK treatment facilities.

Background

AVEK is nearing completion of the DBP Control Project to upgrade their treatment plants with ozonation, deep-bed, biologically active carbon filters, standby primary disinfection, and monochloramines. These new facilities will provide substantial water quality improvements, including cryptosporidium inactivation and taste and odor control. Chemical feed facilities to create a disinfectant residual using monochloramine have been completed, but have not been placed into service pending a final decision on this treatment approach.

Implementation of monochloramines will require coordination with the California Department of Public Health, public notification, chemical purchase contract, and a monitoring program. It is estimated that implementation would incur additional operational costs of approximately \$5 to \$8 per acre-foot and require about 9 months to complete.

GAC Alternative Development

Alternatively, GAC facilities could be added to each of AVEK's four existing treatment facilities. The GAC facilities would work effectively with AVEK's other treatment processes, and would be installed following the existing filters and before the addition of chlorine. Chemical feed facilities for monochloramines would simply remain inactive, and free chlorine would be used for the disinfectant residual.

Treatment using GAC for DBP control would require extensive new facilities, including GAC contactors (vessels), civil site work to allow access for truck loading/unloading, washing and washwater recovery facilities, and new pump stations to allow treated water to be returned to

the plant clearwells. Sufficient space must be provided at each site, along with connections to main roadways, major piping, electrical switchgear, and instrumentation and control systems. At a conceptual level, it appears that implementation is feasible at each treatment plant, and will require CEQA compliance, financing, design and construction of facilities, coordination with the California Department of Public Health, GAC purchase contract, and a monitoring program. It is estimated that the GAC alternative would require between 36 and 42 months for completion.

Predicted GAC Requirements

Integrating post-filtration GAC into the existing treatment processes would reduce the subsequent formation of TTHMs and HAA5 in the distribution system by removing a fraction of organic precursor compounds from the water. Two reports on GAC treatment of State Water Project (East Branch) were reviewed to evaluate the technical and economic aspects of this approach on AVEK facilities:

- Booth, S. et al. (2006) DBP control in high bromide water while using free chlorine during distribution, AwwaRF report.
- MWH Report (2001) Crestline-Lake Arrowhead Water Agency Disinfection Alternatives Evaluation.

In each instance, field data show GAC contactors operated with 15 to 20 minute empty bed contact times (EBCT) on average water quality provide effective removal of DBP precursors for a period of about 60 to 75 days before breakthrough requires GAC replacement. GAC replacement frequency may be increased if multiple contactors are operated in parallel and in a staggered configuration. This is a common mode of operation in which one contactor is taken off-line at a time when the blended effluent exceeds the target effluent TTHM concentrations. Analysis shows that if ten or more contactors are utilized in this fashion, the GAC replacement frequency can be extended.

The capacity and average water production of the AVEK treatment plants are shown in **Table 1**. In total, AVEK's treatment plants provide 118 mgd of capacity and produce on average about 88,000 ac-ft of treated water.

Table 1 – AVEK Water Production Data

Plant	Design Capacity (MGD)	Average Production (MGD)	Average Production (ac-ft/yr)
Acton	4	2.7	3,025
Eastside	10	6.7	7,500
Rosamond	14	9.3	10,400
Quartz Hill	90	60	67,200

One important consideration for predicting GAC performance requirements is the presence of high levels of bromide in the raw water. Replacement becomes more frequent when bromide levels increase. Unfortunately, this does periodically occur in State Water Project supplies due to the influence of the Sacramento-San Joaquin River Delta on water quality.

For this reason, both average and high bromide conditions are presented in the analysis. Based on the two studies referenced above, the predicted GAC requirements for each of AVEK's four treatment plants are presented below in Table 2. In total, AVEK would need to purchase nearly 11 million pounds of GAC in an average year to comply with the DBP regulations at all four plants. In a year of poor water quality, GAC purchases could increase to as much as 19 million pounds.

Table 2 – GAC Contactor and Replacement Requirements

Plant	No. Vessels	Replacement Period		GAC Inventory (lbs)	GAC Use (lbs/yr)	
		Ave Br	Hi Br		Ave Br	Hi Br
Acton	8	130	70	160,000	450,000	830,000
Eastside	20	160	90	400,000	920,000	1,600,000
Rosamond	28	160	90	560,000	1,300,000	2,300,000
Quartz Hill	180	160	90	3,600,000	8,200,000	14,600,000

¹ Empty Bed Contact Time (EBCT) is 15 minutes

² GAC contactor vessels hold 20,000 lbs.

³ GAC utilization rate is 0.045 g/l, Booth S., et al (2006)

Estimated GAC Costs

Construction and O&M costs have been estimated for each of AVEK's four treatment plants based on the requirements presented above. Estimates are in June 2009 dollars and do not account for inflation. The opinion of probable construction cost reflects a conceptual level of project development (AACE Class 5), with a range of accuracy from -30 to +30%. Engineering, administration, and construction contingency are included at the stated percentage.

Quotes were received both for costs of GAC contactor vessels and GAC purchase, and the lowest quotes were used in each instance. For the purposes of this conceptual study, GAC vessels have been assumed at all four installations. While this is a likely configuration for the three smaller plants, additional engineering effort might find custom concrete GAC contactors more appropriate at the larger Quartz Hill Plant. This level of refinement should be considered if future studies are warranted.

The results of the costs estimates are presented in Tables 3 and Table 4 on the following page.

Table 3 – Opinion of Probable Construction Costs¹

Cost Items	Acton	Eastside	Rosamond	Quartz Hill
Contactor Vessels ²	\$ 880,000	\$ 2,200,000	\$ 3,100,000	\$ 19,800,000
Pump Station	200,000	300,000	500,000	1,300,000
Civil/Sitework	300,000	600,000	700,000	4,700,000
Yard Piping	200,000	500,000	600,000	4,900,000
Electrical/I&C	300,000	700,000	800,000	3,900,000
Sub-Total	\$ 1,900,000	\$ 4,300,000	\$ 5,700,000	\$ 34,600,000
Engineering/Admin (20%)	400,000	800,000	1,100,000	6,900,000
Contingency (30%)	600,000	1,300,000	1,700,000	10,400,000
Total Estimated Cost	\$ 2,900,000	\$ 6,400,000	\$ 8,500,000	\$ 52,000,000

¹ The Class 5 opinion of probable construction cost is prepared in accordance with the Association for the Advancement of Cost Engineering. It is acknowledged that MWH has no control over costs of labor, materials, competitive bidding environments and procedures, unidentified field conditions, financial and/or market conditions, or other factors likely to affect the opinion of probable construction cost of this project, all of which are and will unavoidably remain in a state of change, especially in light of the high volatility of the market attributable to Acts of God and other market events beyond the control of the parties. It is further acknowledged that this is a "snapshot in time" and that the reliability of this opinion of probable construction cost will inherently degrade over time. MWH cannot, and does not, make any warranty, promise, guarantee, or representation, either expressed or implied, that proposals, bids, project construction costs, or cost of operation or maintenance will not vary substantially from MWH's good faith Class 5 opinion of probable construction cost.

² GAC contactor vessel cost based on quote provided by Calgon Carbon Corporation

Table 4 – Estimated O&M Costs

Cost Items	Acton	Eastside	Rosamond	Quartz Hill
GAC Replacement ¹	\$ 680,000	\$ 1,380,000	\$ 1,950,000	\$ 12,300,000
Labor ²	52,000	52,000	52,000	104,000
Energy ³	9,000	24,000	32,000	210,000
Maintenance ⁴	58,000	130,000	170,000	1,040,000
Total Annual O&M Cost	\$ 800,000	\$ 1,600,000	\$ 2,200,000	\$ 13,600,000

¹ GAC replacement cost estimated at \$1.50 per pound.

² Labor estimated at \$50 per hour.

³ Energy estimated at \$0.15 per kwh and 21 kwh per ac-ft/yr.

⁴ Maintenance estimated at 2% of estimated construction cost.

The values from Tables 3 and 4 are summarized and presented below in Table 5 as annual and unit costs. Unit costs of GAC treatment for DBP control at the AVEK plants are estimated to range from a low of \$265 per acre-foot to a high of \$340 per acre-foot, with an average across of all four plants of \$270 per acre-foot.

Table 5 – Estimated Annual and Unit GAC Costs

Plant	Construction Cost (\$)¹	O&M Cost (\$)	Total Annual Cost (\$)	Unit Cost (\$/ac-ft)
Acton	\$ 230,000	\$ 800,000	\$ 1,030,000	\$ 340/ac-ft
Eastside	510,000	1,600,000	2,100,000	\$ 280/ac-ft
Rosamond	680,000	2,200,000	2,900,000	\$ 280/ac-ft
Quartz Hill	4,200,000	13,600,000	17,800,000	\$ 265/ac-ft
Totals	\$ 5,600,000	\$ 18,200,000	\$ 23,800,000	\$ 270/ac-ft

¹ Based on 5% interest rate and 20 year recovery period (Capital Recovery Factor = 0.08024).

Additional Considerations

GAC replacement accounts for roughly 90% of the annual O&M cost and 70% of the combined total annual cost. Probable costs are highly dependent upon the assumed carbon utilization rate, which may vary depending on raw water quality, performance of other treatment processes, the presence of bromide, and the specific characteristics of the GAC. One example of this has been illustrated in Table 2, where high bromide alone could increase GAC use by 80% over average conditions.

The GAC alternative would limit TTHM concentrations in the distribution system to a range of about 60 to 80 ug/l, while the monochloramine alternative would control TTHM concentrations to below 30 ug/l. To lower TTHM concentrations to equal levels, the costs of GAC treatment would increase substantially to nearly \$700 per acre-foot, in comparison to the \$5 to \$8 per acre-foot for monochloramines.

Other considerations associated with a GAC alternative include:

- GAC costs are variable and closely tied to the price of energy for manufacture and transport.
- Roughly 90% of GAC is currently imported and supply reliability is not assured.
- The future of import tariffs on GAC costs is not known.
- Implementation of the GAC alternative would make AVEK the largest known public user of GAC west of the Mississippi River.
- It is estimated that use of GAC at AVEK will consume roughly 120,000 mwh of power and generate about 100,000 metric tons of carbon dioxide each year.

Attachment 4

The Los Angeles County Department of Public Works, Waterworks District

Antelope Valley- Acton Water Issue Survey

Report of Findings

April 21-25, 2010

320-409

Fairbank, Maslin, Maullin, Metz & Associates - FM3

Public Opinion Research & Strategy

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INTRODUCTION AND METHODOLOGY

The Los Angeles County Department of Public Works that administers Waterworks Districts commissioned a survey of their Antelope Valley customers living in District 40 (non-Acton area) and District 37 (Acton). The primary goal of this survey is to gauge customer attitudes toward the two water disinfection methods being considered as a replacement for the method currently being used. Respondents were provided with a balanced description of the two water disinfection methods, chloramines and granular activated carbon (GAC); as well as an equal number of statements supporting each method. Throughout the survey, as additional information was provided, respondents were asked a number of times to indicate their preference. Further, respondents were asked to recall which agency provides them with their home tap water, as well as to rate various aspects of their tap water and the Districts' job performance.

The survey was conducted by telephone with 440 randomly selected residential District customers living in Antelope Valley. More specifically, the original sample consisted of 400 customers, whose geographic proportions mirrored the actual distribution of customers. The result was that 390 residential customers (97.5 percent) were randomly selected from District 40 (non-Acton area) and ten District 37 residential customers (2.5 percent) were randomly selected to make up the balance of the sample. In order to ensure that the comparatively small number of Acton area customers' attitudes are well represented, Fairbank, Maslin, Maullin, Metz & Associates oversampled an additional 40 Acton area customers. Therefore, the final sample consisted of 390 District 40 (non-Acton area) residential customers and 50 District 37 (Acton) residential customers. For the purpose of this analysis, when all Antelope Valley customers are discussed, the overall sample is reweighted to mirror the actual geographic distribution. This overall sample of 440 yields a margin of error of plus or minus 4.8 percent. In the cases where half the overall sample is examined the margin of error increases to plus or minus 6.7 percent. When non-Acton customers attitudes are examined, the margin of error is plus or minus 5.0 percent and plus or minus 13.9 percent for the Acton customer sample. This survey questionnaire was prepared by Fairbank, Maslin, Maullin, Metz & Associates in consultation with the Los Angeles County Department of Public Waterworks District staff. The interviews took place from April 21st to April 25th, 2010.

Below is an outline of the four sections of the report. Following the outline, a summary of the findings is presented. The remaining six section of the report describes each finding in more detail.

- **Section 1** examines customer awareness of the tap water-related issues affecting the Antelope Valley area.
- **Section 2** explores customer preferences for GAC and chloramines as a replacement disinfection treatment in lieu of the current chlorine method. Further, this section explores customer reaction to messages presented from advocates of the two respective methods.
- **Section 3** gauges customer awareness of the District and their views of the District.
- **Section 4** investigates customer perceptions of their home tap waters' safety, taste and pressure. It also documents the percentage of customers who report they drink water straight from the tap at home.

Full topline results of the survey are included at the end of the report as an Appendix.

SUMMARY OF FINDINGS

The 2010 Antelope Valley Water Issues Survey of 440 respondents shows that a majority of Los Angeles County Department of Public Works, Waterworks District customers in District 40 (non-Acton area) and District 37 (Acton) when faced with a choice between the two proposed water disinfection methods prefer GAC over chloramines. Several times over the course of this survey, all customers are presented with a choice between the two methods. The choice comes after limited information is provided, after sharing some objective facts about the need to change the current chlorine disinfection method; and after five arguments in favor of each respective side are mentioned. Following each one of these aforementioned circumstances, a majority of respondents preferred GAC over chloramines. Regardless of whether or not pro-GAC or pro-chloramines arguments are presented first or second, the majority preference for GAC prevails (56 percent GAC and 31 percent chloramines).

It is important to point out that customer awareness of this issue at the time of the survey was relatively low. When initially asked to declare a preference, 47 percent, or almost half the sample, said they were undecided. Additionally, 71 percent of customers change their choice at least one time during the course of the survey (65 percent) or are consistently undecided (six percent), indicating that those customers are persuadable.

The pro-GAC arguments that appear to be the most compelling to favor GAC over chloramines deal with a number of actual or potential negative outcomes associated with the use of chloramines, but not with the use of GAC. The general themes deal with health safety and cost. Specifically, these negative outcomes include chloramines:

- Creating harmful chemicals
- Causing some people and business to spend additional money to remove chloramines before water can be used for such purposes as aquariums, ponds and kidney dialysis
- Degrading rubber found in such items as toilet flappers, causing additional customer expense and hassle
- Leading to potential health problems, such as weakening immune system and respiratory, skin and kidney problems

The one pro-chloramines argument to receive any notable reaction centers around the additional cost associated with the use of the GAC method compared to the chloramines method. In the case of non-Acton area it is expected that a typical bi-monthly residential water bill will increase by \$38 compared to eight dollars using chloramines. In the Acton area, it is expected to increase to \$53 over the same period compared to only eight dollars using chloramines. Yet, in spite of the concern for the increased rates, customers continued to favor GAC over chloramines.

Customers are relatively well informed as to who provides them with residential tap water and a sizable majority has favorable views of the District. Roughly three-quarters of District customers (73 percent) are able to volunteer the Los Angeles County Department of Public Works, Waterworks District as their residential tap water provider. Almost all customers (93 percent) offer the District with an excellent, above average or average job performance rating. Only five percent give it a below average or poor rating. Moreover, the highest percentage of respondents (77 percent) give the District a favorable rating among a list of six government agencies and utilities.

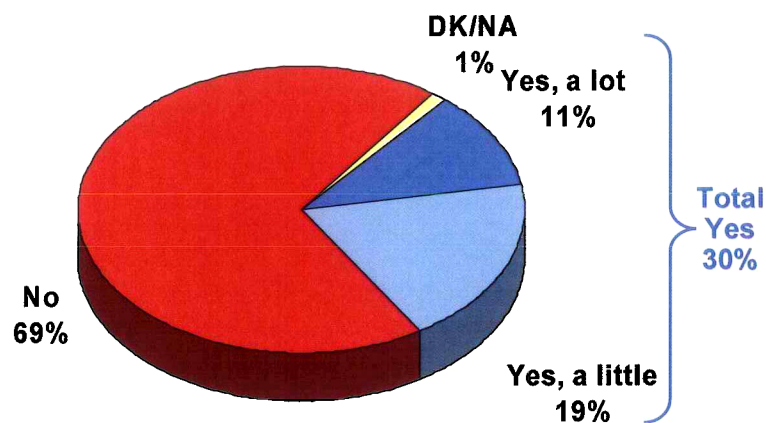
A sizable majority of customers considers their home tap water to be safe (76 percent). Forty-one percent rate the taste of their tap water as excellent or good. Seventy-six percent rate their water pressure to be excellent or good. However, only 13 percent drink tap water straight from the tap, without additional filters.

SECTION 1: AWARENESS AND ATTITUDES TOWARD TAP WATER TREATMENT ISSUES

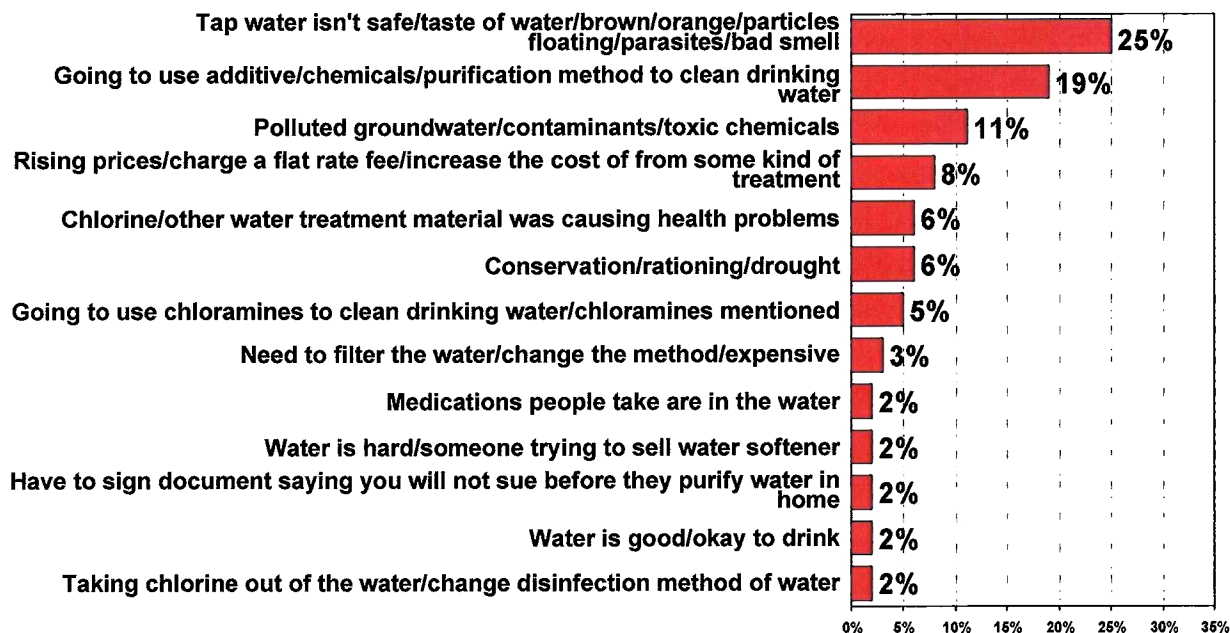
1.1 Awareness of Tap Water-Related Issues in the Area

While some District customers volunteer they have seen or heard something about the problem with their tap water, awareness of the details is somewhat limited. Three in ten District customers (30 percent) have seen or heard something about tap water-related issues in the area, with 11 percent saying a lot and 19 percent saying a little. Seven in ten District customers (70 percent) have not seen or heard anything on related issue (see **Figure 1**).

Figure 1: Seen or Heard About Tap Water-Related Issues in Your Area



Among the 30 percent of the customers who said they had seen or heard a lot or a little about water-related issues in their area, a quarter (25 percent) volunteered that they had seen or heard something that indicated that tap water is not safe. A further nineteen percent said there was going to be some additive or chemical placed into the drinking water and 11 percent mentioned something about polluted ground water or associated contaminants. Only 6 percent mentioned chlorine or other water treatment materials were causing health problems and five percent mentioned chloramines in their response. Interestingly, no mention was made of granular activated carbon (GAC) by any of the respondents (see **Figure 2** for grouped responses of two percent or more).

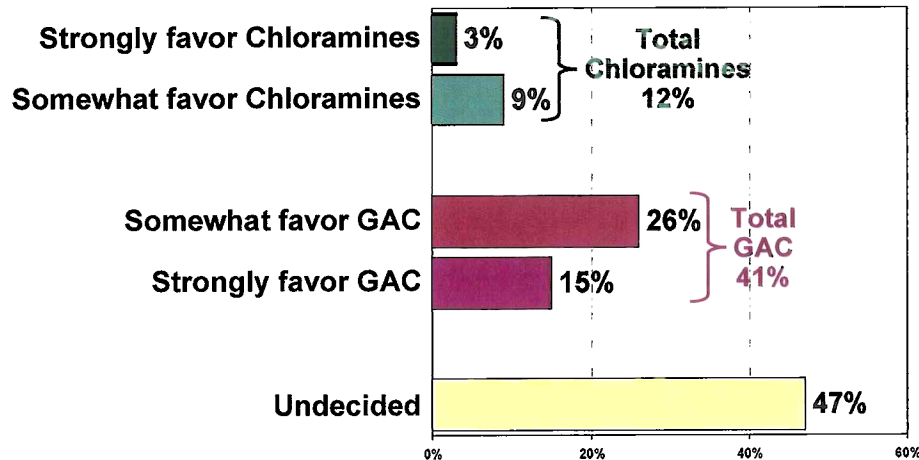
Figure 2: What Seen or Heard About Tap Water-Related Issues in Your Area*(Grouped Responses, Ranked by Most Frequent Responses 2% or More)**(30% of Sample)*

1.2 Initial Water Treatment Preference

Initially, a plurality of District customers (47 percent) are undecided as to which water disinfection method they prefer; however, by slightly more than a three-to-one ratio those who expressed a preference favored granular activated carbon (GAC) over chloramines (41 to 12 percent). With very little information, other than a mention of the two treatment methods being considered, a brief explanation of the agencies involved and the reason for the change in treatment¹, customers said they prefer the GAC treatment method (41 percent) over the chloramines treatment method (12 percent). Specifically, 15 percent strongly favored GAC and another 26 percent somewhat favored GAC. Only three percent strongly favor chloramines and nine percent somewhat favor chloramines. Slightly less than one in every two customers (47 percent) were initially undecided (see Figure 3).

Figure 3: Initial Preference for Water Disinfection Method

¹ Initial information provided: "Due to a recent U.S. Environmental Protection Agency ruling, the Los Angeles County Department of Public Works, Waterworks District along with its wholesale water agency, Antelope Valley-East Kern Water Agency also known as AVEK, is required to change the method they use to treat your area's tap water."



Initially by area, non-Acton area customers who offer a preference, select GAC over Chloramines, with 41 percent choosing GAC and only 12 percent selecting Chloramines. Similarly, 48 percent of Acton residents prefer GAC compared to six percent who favor Chloramines. Close to one in every two customers were initially undecided in both the non-Acton (47 percent) and Acton areas (46 percent).

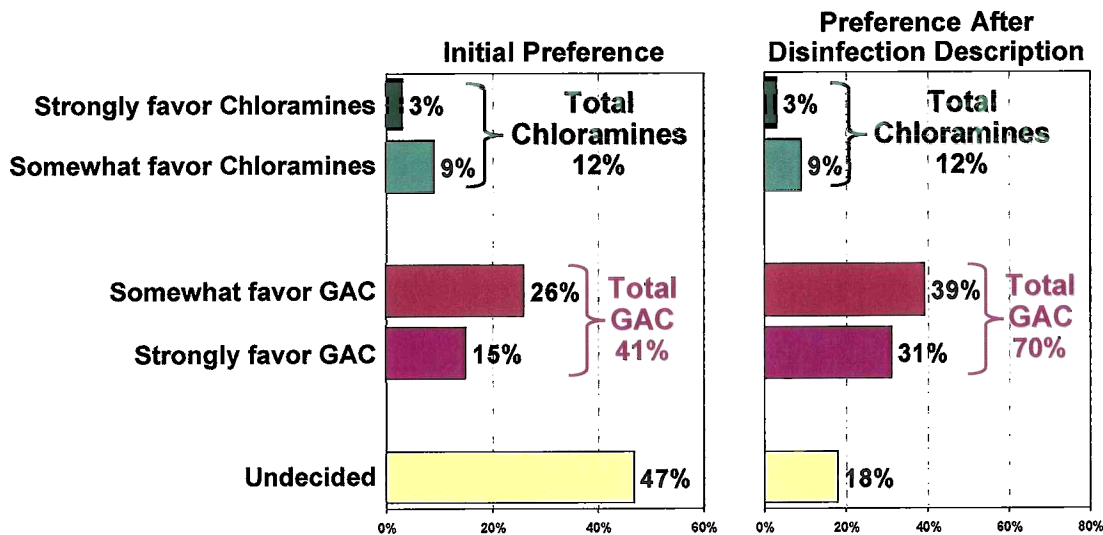
1.3 Water Treatment Preference after More Information

Additional objective information about the issue leads to a dramatic shift in support from the previously undecided customers into the GAC camp. The result is a more than five-to-one ratio in favor of GAC over Chloramines (70 to 12 percent). After more background information is provided², a sizable majority of District customers (70 percent) preferred the GAC treatment method over the alternative chloramines treatment method (12 percent). Thirty-one percent strongly favored GAC and 39 percent somewhat favored GAC. Again, only three percent strongly favored chloramines and nine percent somewhat favored chloramines. While there was no change in the percentage of customers who favored the use of chloramines, those favoring the GAC method increased by 29 percent from initial preference ratings. The increase

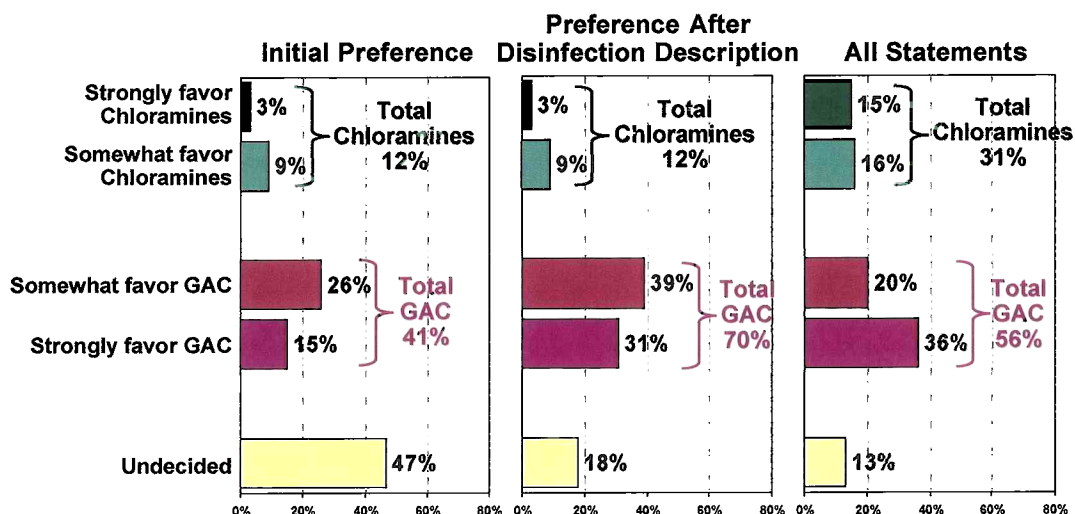
² A significant portion of the Waterworks District's water supply is water purchased from the Antelope Valley-East Kern Water Agency, also known as AVEK. AVEK disinfects its water with chlorine to prevent disease-causing microorganisms from growing in the pipelines that carry water to homes and businesses. Unfortunately, some of the chlorine used for disinfection combines with organic matter in water to form unhealthy chemicals. Recently the U.S. Environmental Protection Agency strengthened tap water standards to control formation of such unhealthy chemicals. These new standards require AVEK and the Waterworks District to change their current method of treating tap water by (for District 37 – say “2014”) (for District 40 – say “2012”). There are two options being considered. One method is to disinfect the water with chloramines, which is created by adding ammonia to the chlorine currently being used. This method reduces the unhealthy chemicals forming in the water. The other option is to include granular activated carbon, also known as GAC, in the treatment process. This method removes some of the organic matter before adding chlorine and reduces the unhealthy chemicals in the water.

in preference for GAC occurred from those customers who were initially undecided moving into the GAC camp. Almost two in every ten customers (18 percent) remained undecided after additional background information (see **Figure 4**). Similar trends exist in the non-Acton (70 percent GAC – 12 percent Chloramines) and Acton (64 percent GAC – 14 percent Chloramines) areas, respectively

Figure 4: Initial Disinfection Preference and Preference After Disinfection Description



Five messages on behalf of each of the two proposed disinfection method results in a majority of customers (56 percent) continuing to prefer GAC. The preference for GAC continues in spite of the 19 percentage point increase in support for chloramines from the customers' initial preference response to their final response (12 to 31 percent). After all arguments are presented, a majority of respondents (56 percent) state they prefer the GAC treatment method (31 percent) over the chloramines treatment method. In terms of intensity, slightly more than a third of the customers (36 percent) strongly favor GAC, where as only 15 percent strongly favor chloramines. In spite of the fact that objective background information, as well as arguments supporting each respective treatment is provided, 15 percent continued to be undecided as to the method of preference by the end of the survey. Within that undecided subsample one-third had no preference or did not care which method was chosen (see **Figure 5**). In comparing the Non-Acton area and the Acton area, there appeared to be no statistical difference between geographic area responses.

Figure 5: Initial Disinfection Preference and Preference After Disinfection Description and All Statements

One-quarter of District customers (26 percent) consistently choose GAC throughout the survey as their preferred treatment method. Alternatively, only three percent of respondents consistently select chloramines. Finally, 71 percent of voters change their choice³ at least one time during the course of the survey (65 percent) or are consistently undecided (six percent).

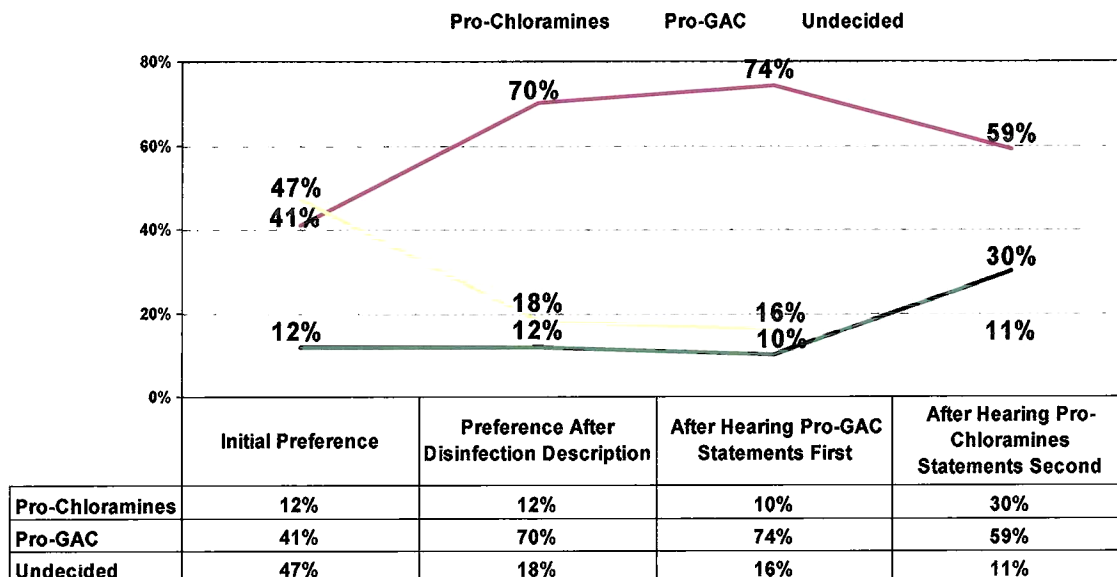
In order to eliminate the potential bias associated with all respondents hearing supportive statements for one treatment method first, half the sample was presented with a randomized set of five pro-chloramines arguments first and half the sample was presented with a randomized set of five pro-GAC arguments first.

When pro-GAC statements are presented first and followed by pro-chloramines statement: Respondents continue to react extremely favorably to the GAC alternative after hearing the supportive statements about this method first. Having just heard pro-GAC statements, preference for the GAC method increases four percentage points (from 70 to 74 percent). Alternatively, the percent who prefer chloramines declines two percentage points (from 12 to ten percent) and so does the percentage who are undecided (from 18 to 16 percent). After pro-chloramines arguments are presented last, preference for chloramines increases 20 percentage points (from ten to 30 percent) and preference for GAC declines 15 percentage points (from 74

³ Chose here includes GAC, chloramines or undecided.

to 59 percent). Additionally, the percentage of customers who are undecided drops 5 point (from 16 to 11 percent) (see **Figure 6**).

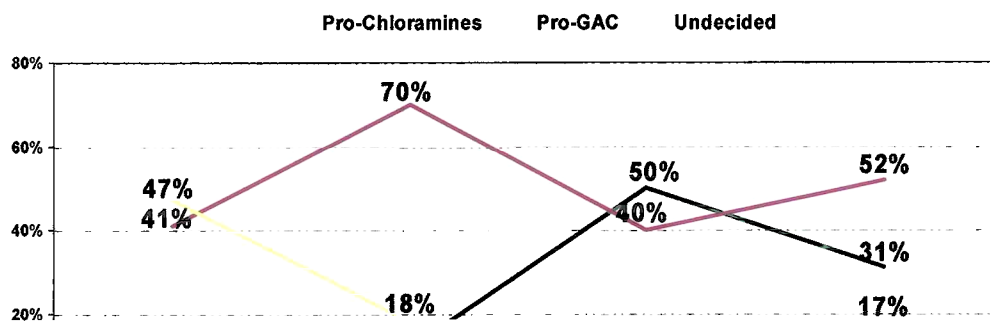
Figure 6: Preference Progression When Pro-GAC Statements Are Read First



When pro-chloramines statements are presented first and followed by pro-GAC statement:

Respondents react much more favorably toward the chloramines method and preference for GAC method drops after only receiving pro-chloramines statements. However, once GAC arguments are presented a majority of customers are back supporting the GAC method. Having only heard pro-chloramines statements support for chloramines increases 38 percentage points (from 12 to 50 percent). At the same time, preference for GAC declines 30 percentage points (from 70 to 40 percent) and the undecided drop eight points from 18 to ten percent. After pro-GAC arguments are presented, a majority (52 percent) select GAC on the last ask; for an increases of 12 percentage points. Chloramines lose nine percent support, resulting in 31 percent of customers preferring chloramines. Finally, the undecided increases seven percentage points (from ten to 17 percent) (see **Figure 7**).

Figure 7: Preference Progression When Pro-Chloramines Statements Are Read First



In sum, regardless of the order of the arguments, preference for GAC trumps chloramines. Further, there is a similar final percentage gap of support between both disinfectant methods regardless of which series of statements are presented first. After all statements are presented, with GAC first, the percentage gap in favor of GAC versus chloramines is 19 percent (59 to 30 percent). Similarly, when pro-chloramines statements are presented followed by GAC statements, the percentage gap in favor of GAC versus chloramines is 21 percent (52 to 31 percent). Lastly, it is noteworthy that support appears slightly higher for GAC at the end of the survey when GAC arguments are presented first and chloramines arguments second compared to when the reverse order of arguments occurs (59 to 52 percent). That having been said, the results are within the margin of error and caution should be taken in the interpretation of the aforementioned observation.

SECTION 2: REACTIONS TO PRO-GAC AND PRO-CHLORAMINES ARGUMENTS

2.1 Reaction to Pro-GAC Arguments

All five pro-GAC arguments receive favorable reactions, which further result in GAC being the preferred disinfection method. In general, District customers reacted much more favorably to pro-GAC treatment statements than to pro-chloramines statements. In case of the pro-GAC statements, a majority (ranging from 59 to 65 percent) indicated that they would be more inclined to view the GAC method favorably after hearing each of the respective five statements. The four most persuasive and statistically indistinguishable Pro-GAC arguments, which center on health safety and cost issues, include the following:

- **While it is true that chloramines reduce the regulated harmful chemicals, they produce a different kind of harmful chemicals. G.A.C. also reduces the regulated harmful chemicals, and does not create any new harmful chemicals (65 percent more inclined, 40 percent much more inclined).**
- **The chloramines method will require some people and businesses to take extra steps to remove the chloramines before the water can be used for some purposes like aquariums, ponds and kidney dialysis. These additional costs to water customers do not occur with the G.A.C. method (64 percent more inclined, 38 percent much more inclined).**
- **Water quality experts suggest that rubber based items in direct contact with water containing chloramines degrade faster than water containing chlorine. This means that rubber based items such as toilet flapper valves in your home would be needed to be replaced, if the chloramines method is used. We should be using G.A.C. because we don't need the unnecessary hassle and cost associated with chloramines (63 percent more inclined, 37 percent much more inclined).**
- **While the E.P.A. and the California Department of Public Health both say that the two methods being considered are safe to be used in our area's drinking water, some local residents claim that chloramines could cause health problems, such as weakening of the immune system and respiratory, skin, and kidney problems. The Waterworks District should use G.A.C. because we should not take chances with our health (62 percent more inclined, 36 percent much more inclined).**

(see Appendix A for details on customer responses to all five pro-GAC arguments)

2.2 Reaction to Pro-Chloramines Arguments

Only one of the pro-chloramines arguments that deals with the comparatively greater cost to the typical customer, if GAC is selected over chloramines, results in more than 50 percent of Acton customers (56 percent) saying they would be more inclined to favor chloramines (\$53 bi-monthly versus eight dollars bi-monthly). Moreover, the above mentioned cost argument in Acton was the only pro-chloramines argument to match the intensity of response received by all GAC arguments, respectively. In other words, 36 percent of Acton respondents said they would be much more inclined to support chloramines after hearing:

Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using G-A-C will mean that a typical water bill will increase by 53 dollars every two months compared to only an eight dollar increase every two months using chloramines (56 percent more inclined, 38 percent much more inclined).

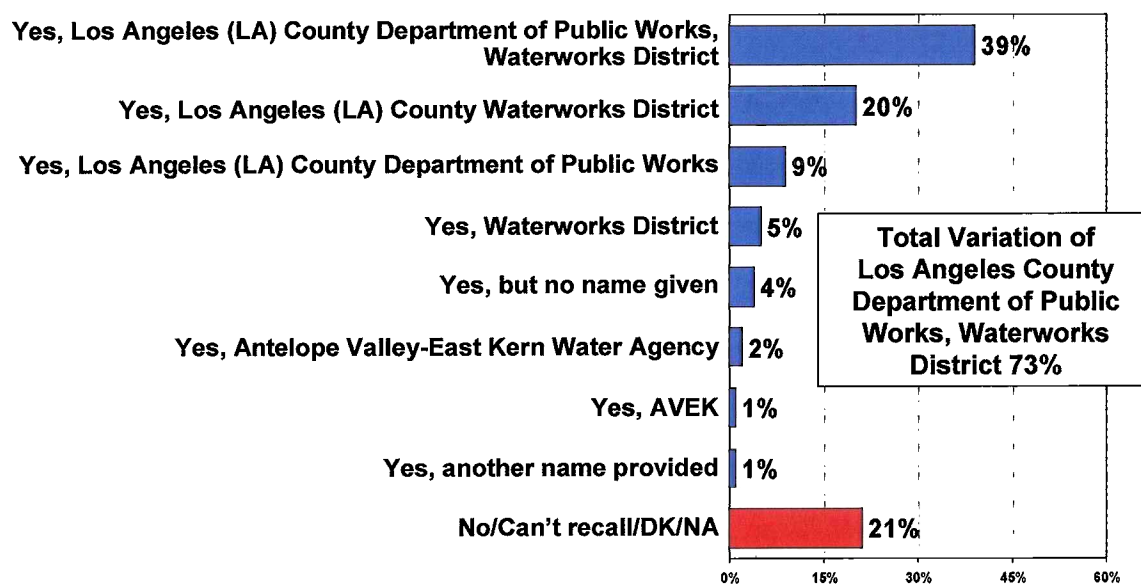
A similar argument, with a typical increased cost of \$38 every two months, presented to non-Acton customers results in a statically comparable response of 49 percent saying they would be more inclined to favor chloramines and only 26 percent saying they would be much more inclined to favor chloramines. The remaining arguments lead to 45 percent or less District customers saying they would be much or somewhat more inclined to favor chloramines (see **Appendix B** for details on customer responses to all five pro-chloramines arguments)

SECTION 3: CUSTOMER AWARENESS AND RATINGS OF WATERWORKS DISTRICT

3.1 Awareness of Waterworks District

A sizable majority of Waterworks District customers volunteered that the Los Angeles County Department of Public Works, Waterworks District is the agency that provides their home tap water. In fact, almost three-quarters of respondents (73 percent) volunteered the District actual name or some variation of name the Los Angeles County Department of Public Works, Waterworks District when asked the question – “*Can you recall the name of the agency that provides your tap water at home?*” Three percent mentioned the name of the wholesaler of the tap water (Antelope Valley-East Kern Water Agency, also known as AVEK) and 21 percent could not recall the name of the agency (see **Figure 8**).

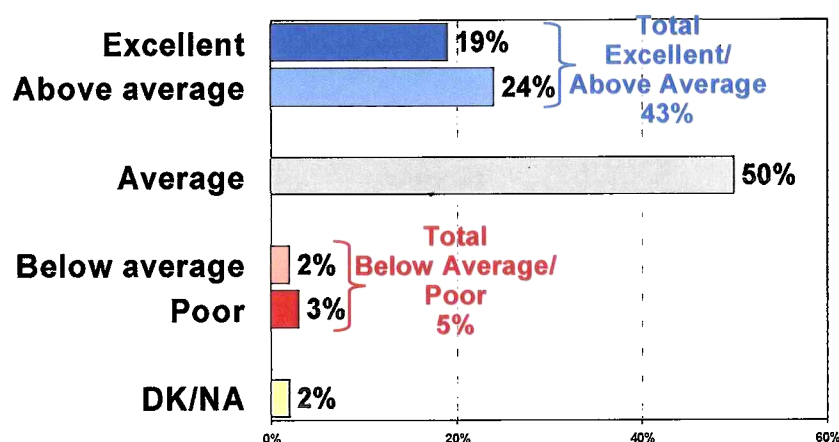
Figure 8: Recollection of the Name of the Agency That Provides Home Tap Water
(Ranked by Most Frequently Cited Names)



3.2 General Performance Rating

More than nine in every ten customers (93 percent) offer the District an average or above rating job performance rating. Specifically, one in every two customers rate the Districts performance as average; however, 19 percent rate it as excellent and 24 percent rate it above average. Only five percent rate it as below average (two percent) or poor (three percent). The remaining two percent are unable to provide a rating (see Figure 9).

Figure 9: Rating of Waterworks District



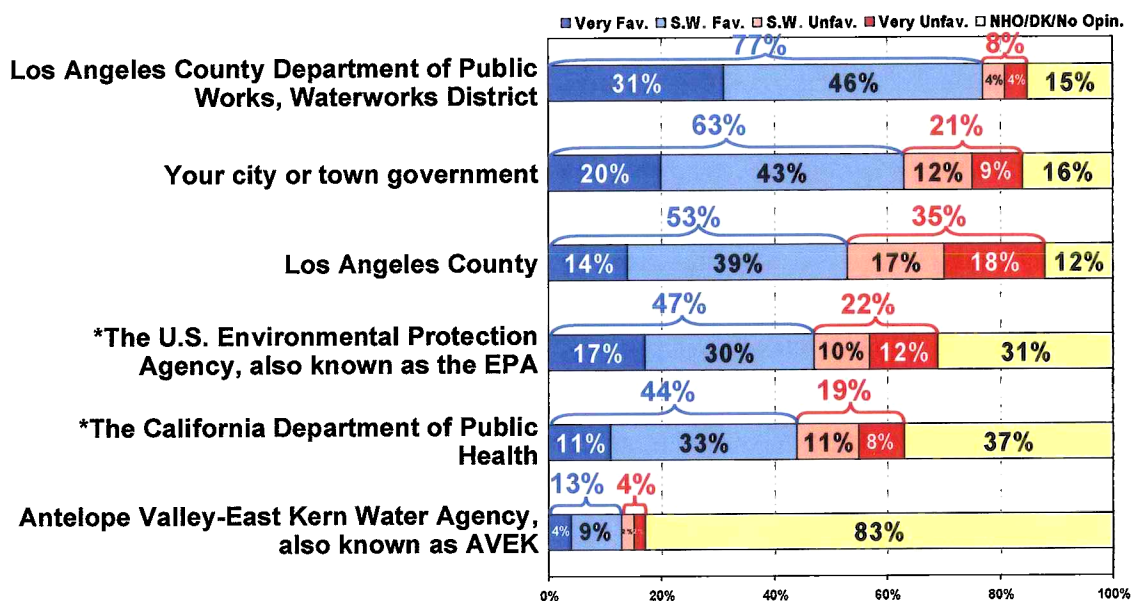
3.3 Comparative Favorable Ratings

Among the seven government agencies and utilities the Waterworks District customers were asked to rate, the highest percentage of respondents rated Los Angeles County Department of Public Works, Waterworks District as favorable. Seventy-seven percent of customers rated the District as either very favorable (31 percent) or somewhat favorable (eight percent). Only eight percent rated the District unfavorably and 16 percent had either never heard of the District or had no opinion either way. City or town government received the second highest percentage of favorable ratings (63 percent), with 20 percent saying very favorable and 43 percent rating it somewhat favorably. Twenty-one percent offered an unfavorable rating of their city or town and 16 percent could not provide a rating. Slightly more than one in every two District customers (53 percent) rated Los Angeles County favorably (14 very favorable; 39 somewhat favorable). Alternatively, 35 percent have unfavorable sentiments of the County. Twelve percent do not know enough or are unable to rate the County. The federal and state agencies, California Department of Public Health and the U.S. Environmental Protection

Agency, receive slightly better than two-to-one favorable to unfavorable ratings, with 47 percent rating the E.P.A. favorably and 22 percent rating it unfavorably and 44 percent rating the State Public Health Department favorably and 19 percent rating it unfavorably. In both cases roughly a third of customers did not know enough to offer an opinion of each respective government agency/department. Finally, only 17 percent of customers were able or willing to offer a rating of the District wholesale water agency, Antelope Valley-East Kern Water Agency. Four percent of District customer gave the Water Agency a very favorable rating, nine percent gave it a somewhat favorable rating and four percent offered an unfavorable rating to the Water Agency (see Figure 10).

Figure 10: Favorability Ratings of Government Agencies or Utilities

(Ranked by Total Favorable)

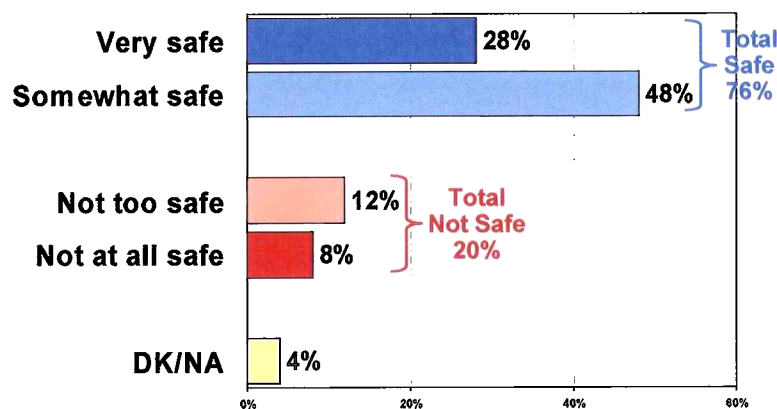


SECTION 4: PERCEPTIONS OF HOME TAP WATER

4.1 Safety Perceptions

Approximately three-quarters of all customers (76 percent) consider their home tap water to be safe to drink. Two in every ten rate their tap water as either not too safe (12 percent) or not at all safe (eight percent) (see **Figure 11**).

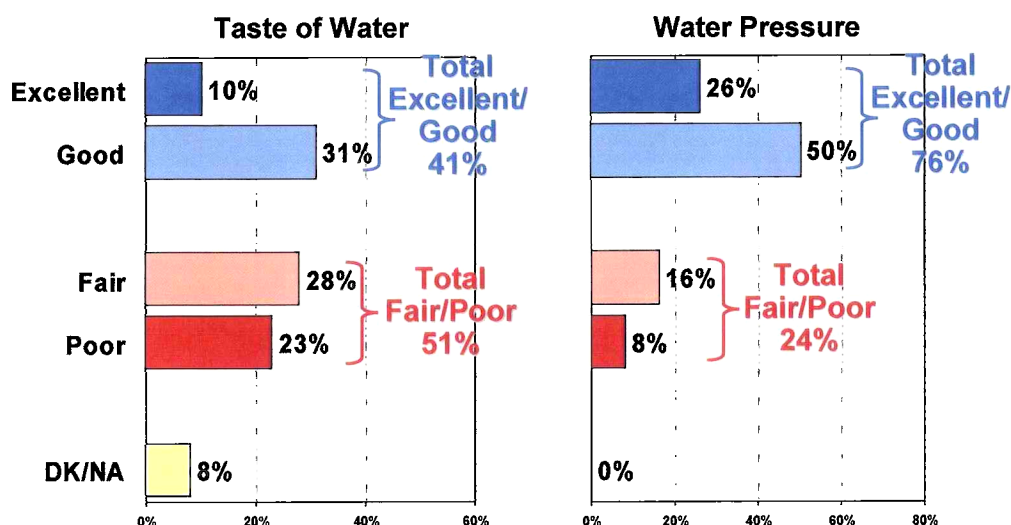
Figure 11: Safety Rating of Home Tap Water



4.2 Perceptions of Taste and Water Pressure

Roughly half of all customers offer fair or poor ratings when it comes to the taste of the tap water, though approximately three-quarters offer favorable ratings of their water pressure. Only four in ten customers (41 percent) offer a favorable rating of the taste of their home tap water, with ten percent rating it as excellent and 31 percent as good. A slight majority of customers (51 percent) rate their taste of water as fair (28 percent) or poor (23 percent). The remaining eight percent are unable to rate the taste of their tap water. Alternatively, a sizable majority (76 percent) rate the water pressure that comes out of their tap at home as excellent (26 percent) or good (50 percent). One-quarter of District customers (76 percent) rate their water pressure as fair (16 percent) or poor (eight percent) (see **Figure 12**).

Figure 12: Rating of Taste of Water and Water Pressure

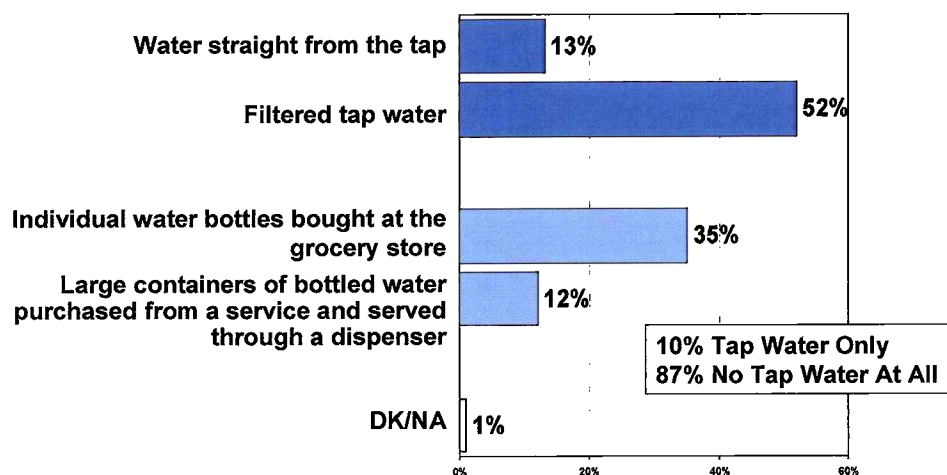


4.3 Kind of Drinking Water Used at Home

An overwhelming majority of District customers do not drink water at home straight from the tap, with only 13 percent said indicating that they do. The most frequently type of water consumed is filtered tap water (52 percent) and a further 35 percent drink water at home from individual bottles bought at the grocery store (see Figure 13).

Figure 13: Kind of Drinking Water Most Frequently Used in Your Household

(Multiple Responses Accepted)



Appendix A: Reactions to Pro-GAC Messages

**Appendix A: Inclination to Favor Chloramines after Hearing
Supportive Chloramines Statements**

(Ranked by Total More Inclined, includes much more and somewhat more)

Statements	Total More Inclined	Much More Inclined	Less Inclined/ Don't Believe	No Effect/ Don't Know/ No Answer
(Acton only) Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using GAC will mean that a typical water bill will increase by <u>\$53</u> every two months compared to only an eight dollar increase every two months using chloramines.	56%	36%	14%	30%
(Non-Acton area only) Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using GAC will mean that a typical water bill will increase by <u>\$38</u> every two months compared to only an eight dollar increase every two months using chloramines.	49%	26%	21%	30%
Using the GAC method will require considerably more time and money than the chloramines method will in order to install the necessary technology in AVEK's four local water treatment plants. It is inefficient and financially wasteful for AVEK to build and operate the more expensive GAC facilities at the treatment plants when chloramines is a safe and reliable disinfectant for our tap water that will also save money	45%	20%	18%	37%
Using the chloramines method will result in our area producing less air pollution than using the GAC method because chloramines requires less imported raw materials, less need for outside processing and results in less fuel emissions than the GAC method.	43%	15%	20%	37%

**Appendix A: Inclination to Favor Chloramines
after Hearing Supportive Chloramines Statements, continued**

(Ranked by Total More Inclined, includes much more and somewhat more)

Statements	Total More Inclined	Much More Inclined	Less Inclined/ Don't Believe	No Effect/ Don't Know/ No Answer
Chloramines have been used as a drinking water disinfectant for almost 90 years in the U.S. and other countries, with two thirds of the California's water companies using this method. History has shown that chloramines is a reliable and safe method for disinfecting our tap water	41%	15%	18%	41%
The GAC method is rarely used for this purpose in water treatment plants as large as AVEK's plants. Using the GAC method at this large scale makes the operation of the water treatment plants more complex and could produce more inconsistent water quality	24%	8%	24%	52%

Appendix B: Reactions to Pro-Chloramines Messages

**Appendix B: Inclination to Favor Chloramines after Hearing
Supportive Chloramines Statements**

(Ranked by Total More Inclined, includes much more and somewhat more)

Statements	Total More Inclined	Much More Inclined	Less Inclined/ Don't Believe	No Effect/ Don't Know/ No Answer
(Acton only) Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using GAC will mean that a typical water bill will increase by <u>\$53</u> every two months compared to only an eight dollar increase every two months using chloramines.	56%	36%	14%	30%
(Non-Acton area only) Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using GAC will mean that a typical water bill will increase by <u>\$38</u> every two months compared to only an eight dollar increase every two months using chloramines.	49%	26%	21%	30%
Using the GAC method will require considerably more time and money than the chloramines method will in order to install the necessary technology in AVEK's four local water treatment plants. It is inefficient and financially wasteful for AVEK to build and operate the more expensive GAC facilities at the treatment plants when chloramines is a safe and reliable disinfectant for our tap water that will also save money.	45%	20%	18%	37%
Using the chloramines method will result in our area producing less air pollution than using the GAC method because chloramines requires less imported raw materials, less need for outside processing and results in less fuel emissions than the GAC method.	43%	15%	20%	37%

**Appendix B: Inclination to Favor Chloramines
after Hearing Supportive Chloramines Statements, continued**

(Ranked by Total More Inclined, includes much more and somewhat more)

Statements	Total More Inclined	Much More Inclined	Less Inclined/ Don't Believe	No Effect/ Don't Know/ No Answer
Chloramines have been used as a drinking water disinfectant for almost 90 years in the U.S. and other countries, with two thirds of the California's water companies using this method. History has shown that chloramines is a reliable and safe method for disinfecting our tap water	41%	15%	18%	41%
The GAC method is rarely used for this purpose in water treatment plants as large as AVEK's plants. Using the GAC method at this large scale makes the operation of the water treatment plants more complex and could produce more inconsistent water quality	24%	8%	24%	52%

Appendix C: Topline Survey Results

ANTELOPE VALLEY-WATER ISSUE SURVEY
320-409 WFT
N=440

Time Began _____
 Time Ended _____
 Minutes _____

Hello, I'm calling from FMA, a public opinion research company. We are not telemarketers trying to sell anything, or asking for a donation of any type. We're conducting a public opinion survey about issues that concern people in your area. May I speak to _____? **YOU MUST SPEAK TO THE PERSON LISTED (IF NOT AVAILABLE, ASK:)** May I please speak to the person in the household who is most responsible for paying the bills each month? **(IF NEITHER PERSON IS AVAILABLE ASK:)** When would be a good time to call back?

- 1 Generally speaking, how would you rate the Antelope Valley as a place to live: is it an excellent place to live, a pretty good place, just fair, or a poor place to live?

Excellent----- 17%
 Good----- 48%
 Just fair----- 26%
 Poor----- 8%
 (DON'T KNOW/NA)----- 1%

I WOULD NOW LIKE TO ASK YOU ABOUT VARIOUS ORGANIZATIONS

- 2 First, can you recall the name of the agency that provides your tap water at home? **(IF YES, ASK: "What is the name of the agency?") (DO NOT READ CHOICES) (ACCEPT MULTIPLE RESPONSES)**

Yes, Los Angeles (LA) County Department of Public Works, Waterworks District ----- 39%
 Yes, Los Angeles (LA) County Department of Public Works ----- 9%
 Yes, Waterworks District ----- 5%
 Yes, Los Angeles (LA) County Waterworks District ----- 20%
 Yes, Antelope Valley-East Kern Water Agency ----- 2%
 Yes, AVEK ----- 1%
 Yes, another name provided ----- 1%
 Yes, but no name given ----- 4%
 No/Can't recall/DK/NA ----- 21%

- 3 Now let me mention a few government agencies or utilities that are active in your area. After I mention each one, please tell me if you have a favorable or unfavorable opinion of that agency or utility. If you have never heard of the agency or utility I ask you about, or don't know enough about it to have an opinion, you can tell me that too. (IF FAVORABLE/UNFAVORABLE, ASK: "Is that very or just somewhat?") (ROTATE)

		<u>VERY FAV.</u>	<u>S.W. FAV.</u>	<u>S.W. UNFAV.</u>	<u>VERY UNFAV.</u>	<u>NEVER HEARD OF</u>	<u>DK/ NO OPIN.</u>
[]a.	Los Angeles County Department of Public Works, Waterworks District -----	31%	46%	4%	4%	3%	13%
[]b.	Antelope Valley-East Kern Water Agency, also known as AVEK -----	4%	9%	2%	2%	44%	38%
[]c.	Your city or town government-----	20%	43%	12%	9%	3%	13%
[]d.	Los Angeles County-----	14%	39%	17%	18%	1%	11%

(ASK SPLIT SAMPLE A ONLY)

[]e.	The U S Environmental Protection Agency, also known as the E.P.A.-----	17%	30%	10%	12%	11%	19%
-------	--	-----	-----	-----	-----	-----	-----

(ASK SPLIT SAMPLE B ONLY)

[]f.	The California Department of Public Health -----	11%	33%	11%	8%	3%	34%
-------	--	-----	-----	-----	----	----	-----

(RESUME ASKING ALL RESPONDENTS)

(IF MENTIONED IN Q2 LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, WATERWORKS DISTRICT READ)

AS YOU MENTIONED THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, WATERWORKS DISTRICT PROVIDES YOU WITH YOUR TAP WATER AT HOME. I WOULD NOW LIKE TO ASK YOU SOME RELATED QUESTIONS.

(IF MENTIONED IN Q2 SOMETHING OTHER THAN LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, WATERWORKS DISTRICT READ)

LET ME GIVE YOU SOME INFORMATION, THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, WATERWORKS DISTRICT PROVIDES YOU WITH YOUR TAP WATER AT HOME. I WOULD NOW LIKE TO ASK YOU SOME RELATED QUESTIONS.

- 4 Generally speaking, how would you rate the services the Los Angeles County Department of Public Works, Waterworks District provides you? Would you say it is excellent, above average, average, below average or poor?

Excellent----- 19%
 Above average----- 24%
 Average----- 50%
 Below average -----2%
 Poor -----3%
 (DON'T READ) Don't Know/No Answer -----2%

5. Next, I am going to mention different aspects of the water that comes out of your tap at home? After each one please tell me if you would rate that aspect as excellent, good, only fair, or poor? Here is the first one

	<u>EXCELLENT</u>	<u>GOOD</u>	<u>ONLY FAIR</u>	<u>POOR</u>	<u>(DK/ NA)</u>
(ROTATE)					
[]a. Taste of water -----	10%	31%	28%	23%	8%
[]b. Water pressure-----	26%	50%	16%	8%	0%

6. Do you consider your tap water at home to be very safe, somewhat safe, not too safe or not at all safe to drink?

Very safe ----- 28%
 Somewhat safe ----- 48%
 Not too safe----- 12%
 Not at all safe-----8%
 (DON'T READ) Don't Know/No Answer -----3%

- 7 Next, have you seen or heard anything about tap water-related issues in your area? (IF YES ASK:) Would you say you have seen a lot or just a little?

Yes, a lot (ASK Q8) ----- 11%
 Yes, a little (ASK Q8) ----- 19%
 No (SKIP TO Q9) ----- 69%
 (DON'T READ) DK/No Answer (SKIP TO Q9)--- 1%

(ASK Q8, IF YES CODES 1 OR 2, IN Q7)

8 In your own words, what have you seen or heard? (CODE VERBATIM)

Tap water isn't safe/taste of water/brown/orange/particles floating/parasites/bad smell -----	25%
Going to use additive/chemicals/purification method to clean drinking water-----	19%
Polluted groundwater/contaminants/toxic chemicals-----	11%
Rising prices/charge a flat rate fee/increase the cost of from some kind of treatment-----	8%
Chlorine/other water treatment material was causing health problems-----	6%
Conservation/rationing/drought-----	6%
Going to use chloramines to clean drinking water/chloramines mentioned-----	5%
Need to filter the water/change the method/expensive -----	3%
Medications people take are in the water-----	2%
Water is hard/someone trying to sell water softener -----	2%
Have to sign document saying you will not sue before they purify water in home-----	2%
Water is good/okay to drink -----	2%
Taking chlorine out of the water/change disinfection method of water-----	2%
Somebody was trying to sell bottled water -----	1%
Reservoir is being depleted -----	1%
Changed the water from chlorine to chloramines -----	1%
High arsenic levels in the natural water wells-----	1%
Put something in the water to kill the fish, but safe for the people-----	1%
Pipeline upgrades were being discussed -----	1%
Environmental issues -----	1%
Waterworks people trying to assure people it was safe to use chloramines-----	1%
Get information from water reports they give out -----	1%
Alkaline levels are high where I live -----	1%
Water treatment plant outside of the city floods every time we get too much rain -----	1%
Turn off water to treat it -----	1%
Information in the mail -----	1%
Need to filter out our drinking water -----	1%
Testing the water -----	1%
Advertisements for private water filters-----	1%
Most people who have wells have recently changed over to tap water-----	0%
Don't know -----	10%

(RESUME ASKING ALL RESPONDENTS)

- 9 Due to a recent U S Environmental Protection Agency ruling, the Los Angeles County Department of Public Works, Waterworks District along with its wholesale water agency, Antelope Valley-East Kern Water Agency also known as AVEK, is required to change the method they use to treat your area's tap water. The two methods being considered are **(ROTATE)** ☐ chloramines and ☐ granular activated carbon, also known as G.A.C. Based on what you know or just my mentioning it, which method would you favor: **(ROTATE)** ☐ chloramines or ☐ granular activated carbon, also known as G.A.C.? **(IF FAVOR, ASK:)** Do you strongly favor the **(CHLORAMINES METHOD/G.A.C. METHOD)** or just somewhat favor?

Strongly favor chloramines----- 3%
Somewhat favor chloramines ----- 9%
Somewhat favor GAC ----- 26%
Strongly favor GAC ----- 15%
(DON'T READ) No preference/Don't care ----- 3%
(DON'T READ) Need more information ----- 33%
(DON'T READ) DK/NA ----- 11%

I WOULD NOW LIKE TO TELL YOU A LITTLE BIT MORE ABOUT THIS TOPIC. (READ SLOWLY)

A SIGNIFICANT PORTION OF THE WATERWORKS DISTRICT'S WATER SUPPLY IS WATER PURCHASED FROM THE ANTELOPE VALLEY-EAST KERN WATER AGENCY, ALSO KNOWN AS AVEK. AVEK DISINFECTS ITS WATER WITH CHLORINE TO PREVENT DISEASE-CAUSING MICROORGANISMS FROM GROWING IN THE PIPELINES THAT CARRY WATER TO HOMES AND BUSINESSES. UNFORTUNATELY, SOME OF THE CHLORINE USED FOR DISINFECTION COMBINES WITH ORGANIC MATTER IN WATER TO FORM UNHEALTHY CHEMICALS. RECENTLY THE U.S. ENVIRONMENTAL PROTECTION AGENCY STRENGTHENED TAP WATER STANDARDS TO CONTROL FORMATION OF SUCH UNHEALTHY CHEMICALS. THESE NEW STANDARDS REQUIRE AVEK AND THE WATERWORKS DISTRICT TO CHANGE THEIR CURRENT METHOD OF TREATING TAP WATER BY (FOR DISTRICT 37 – SAY "2014") (FOR DISTRICT 40 SAY "2012"). THERE ARE TWO OPTIONS BEING CONSIDERED. ONE METHOD IS (ROTATE) ☐ TO DISINFECT THE WATER WITH CHLORAMINES, WHICH IS CREATED BY ADDING AMMONIA TO THE CHLORINE CURRENTLY BEING USED. THIS METHOD REDUCES THE UNHEALTHY CHEMICALS FORMING IN THE WATER. THE OTHER OPTION IS ☐ TO INCLUDE GRANULAR ACTIVATED CARBON, ALSO KNOWN AS G.A.C., IN THE TREATMENT PROCESS. THIS METHOD REMOVES SOME OF THE ORGANIC MATTER BEFORE ADDING CHLORINE AND REDUCES THE UNHEALTHY CHEMICALS IN THE WATER.

- 10 Now that you know a little more about the issue, which method would you favor: **(ROTATE)** [] chloramines or [] granular activated carbon, also known as G.A.C ? **(IF FAVOR, ASK:)** Do you strongly favor the **(CHLORAMINES METHOD/G.A.C. METHOD)** or just somewhat favor?

Strongly favor chloramines-----3%
 Somewhat favor chloramines -----9%
 Somewhat favor GAC -----39%
 Strongly favor GAC -----31%
(DON'T READ) No preference/Don't care -----4%
(DON'T READ) Need more information -----12%
(DON'T READ) DK/NA -----3%

(ROTATE Q11 AND Q13)

- 11 I would now like to mention statements made by those who favor the Los Angeles County Waterworks District using the chloramines method to treat the area's tap water. After hearing each statement, please tell me if it makes you more inclined to favor using the chloramines method. If the statement has no effect on your thinking one way or the other, please tell me that too. **(IF MORE INCLINED, ASK:)** "Is that much more or just somewhat?" **(DON'T READ LESS INCLINED OR DON'T BELIEVE)** **(ROTATE)**

<u>MUCH</u> <u>MORE</u> <u>INCL.</u>	<u>SW</u> <u>MORE</u> <u>INCL.</u>	<u>(LESS</u> <u>INCL.)</u>	<u>(DON'T</u> <u>BEL.)</u>	<u>NO</u> <u>EFF.</u>	<u>DK/NA</u>
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(ASK ALL RESPONDENTS)

- []a. The G.A.C. method is rarely used for this purpose in water treatment plants as large as AVEK's plants. Using the G.A.C. method at this large scale makes the operation of the water treatment plants more complex and could produce more inconsistent water quality -----8%-----16%-----13%-----11%---46%---6%
- []b. Chloramines have been used as a drinking water disinfectant for almost 90 years in the U.S. and other countries, with two thirds of the California's water companies using this method. History has shown that chloramines is a reliable and safe method for disinfecting our tap water -----15%-----26%-----7%-----11%---38%---3%
- []c. Using the chloramines method will result in our area producing less air pollution than using the G.A.C. method because chloramine requires less imported raw materials, less need for outside processing and results in less fuel emissions than the G.A.C. method.-----15%-----28%-----8%-----12%---33%---4%

<u>MUCH MORE INCL.</u>	<u>SW MORE INCL.</u>	<u>(LESS INCL)</u>	<u>(DON'T BEL.)</u>	<u>NO EFF.</u>	<u>DK/NA</u>
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(ASK ALL RESPONDENTS)

[]d Using the G.A.C method will require considerably more time and money than the chloramine method will in order to install the necessary technology in AVEK's four local water treatment plants. It is inefficient and financially wasteful for AVEK to build and operate the more expensive G.A.C facilities at the treatment plants when chloramine is a safe and reliable disinfectant for our tap water that will also save money ----- 20% ----- 25% ----- 7% ----- 11% --- 33% ----3%

(ASK IN DISTRICT 37, ACTON AREA ONLY)

[]e Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using G.A.C will mean that a typical water bill will increase by 53 dollars every two months compared to only an eight dollar increase every two months using chloramines ----- 36% ----- 20% ----- 2% ----- 12% --- 29% ----2%

(ASK IN DISTRICT 40, NON-ACTON AREA ONLY)

[]f Since both methods are approved approaches to meet the new regulations, it only makes sense to use chloramines because it is also the most cost effective method. In our area, using G.A.C will mean that a typical water bill will increase by 38 dollars every two months compared to only an eight dollar increase every two months using chloramines. ----- 26% ----- 23% ----- 7% ----- 14% --- 26% ----3%

(RESUME ASKING ALL RESPONDENTS)

- 12 Now that you have heard more about the issue let me ask you again: which method would you favor (ROTATE) [] chloramines or [] G.A.C ? (IF FAVOR, ASK:) Do you strongly favor the (CHLORAMINES METHOD/G.A.C. METHOD) or just somewhat favor?

	PRO CHLORAMINES <u>FIRST</u>	PRO G.A.C. <u>FIRST</u>
Strongly favor chloramines -----	24%	3%
Somewhat favor chloramines -----	26%	7%
Somewhat favor GAC -----	15%	22%
Strongly favor GAC -----	25%	52%
(DON'T READ) No preference/Don't care -----	3%	5%
(DON'T READ) Need more information -----	4%	9%
(DON'T READ) DK/NA -----	3%	2%

(ROTATE Q13 AND Q11)

- 13 I would now like to mention statements made by those who favor the Los Angeles County Waterworks District using the granular activated carbon method, also known as G.A.C., to treat the area's tap water. After hearing each statement, please tell me if it makes you more inclined to favor using the G.A.C. method. If the statement has no effect on your thinking one way or the other, please tell me that too (IF MORE INCLINED, ASK:) "Is that much more or just somewhat?" (DON'T READ LESS INCLINED OR DON'T BELIEVE) (ROTATE)

MUCH MORE <u>INCL.</u>	SW MORE <u>INCL.</u>	(LESS INCL)	(DON'T BEL.)	NO EFF.	<u>DK/NA</u>
---------------------------------------	-------------------------------------	------------------------	-------------------------	--------------------	---------------------

(ASK ALL RESPONDENTS)

- []a. While the E.P.A. and the California Department of Public Health both say that the two methods being considered are safe to be used in our area's drinking water, some local residents claim that chloramines could cause health problems, such as weakening of the immune system and respiratory, skin, and kidney problems. The Waterworks District should use G.A.C. because we should not take chances with our health. ----- 36% ----- 26% ----- 5% ----- 7% ----- 21% ----- 4%
- []b. While it is true that chloramines reduce the regulated harmful chemicals, they produce a different kind of harmful chemical. G.A.C. also reduces the regulated harmful chemicals, and does not create any new harmful chemicals. ----- 40% ----- 25% ----- 3% ----- 5% ----- 23% ----- 5%

<u>MUCH MORE INCL.</u>	<u>SW MORE INCL.</u>	<u>(LESS INCL)</u>	<u>(DON'T BEL.)</u>	<u>NO EFF.</u>	<u>DK/NA</u>
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(ASK ALL RESPONDENTS)

- []c. Water quality experts suggest that rubber based items in direct contact with water containing chloramines degrade faster than water containing chlorine. This means that rubber based items such as toilet flapper valves in your home would be needed to be replaced, if the chloramines method is used. We should be using G.A.C. because we don't need the unnecessary hassle and cost associated with chloramines. ----- 37% ----- 26% ----- 3% ----- 5% ----- 25% ----- 4%
- []d. Chloramines persist in the environment longer than chlorine. Some local citizens have expressed concerns that water treated with chloramines could cause contamination of local groundwater. ----- 34% ----- 25% ----- 7% ----- 7% ----- 22% ----- 6%

(ASK ALL RESPONDENTS CONTINUED)

- []e. The chloramines method will require some people and businesses to take extra steps to remove the chloramines before the water can be used for some purposes like aquariums, ponds and kidney dialysis. These additional costs to water customers do not occur with the G.A.C. method. ----- 38% ----- 26% ----- 5% ----- 4% ----- 24% ----- 3%

- 14 Sometimes over the course of a survey like this one, people change their minds. Please let me ask you one last time, which method would you favor: **(ROTATE)** [] chloramines or [] G.A.C ? **(IF FAVOR, ASK:)** Do you strongly favor the **(CHLORAMINES METHOD/G.A.C. METHOD)** or just somewhat favor?

	<u>PRO CHLORAMINES FIRST</u>	<u>PRO G.A.C. FIRST</u>	<u>OVERALL</u>
--	--------------------------------------	---------------------------------	----------------

Strongly favor chloramines -----	14% -----	16% -----	15%
Somewhat favor chloramines -----	16% -----	15% -----	16%
Somewhat favor GAC -----	22% -----	17% -----	20%
Strongly favor GAC -----	37% -----	35% -----	36%
(DON'T READ) No preference/Don't care -----	4% -----	5% -----	5%
(DON'T READ) Need more information -----	5% -----	9% -----	7%
(DON'T READ) DK/NA -----	3% -----	3% -----	3%

HERE IS MY LAST QUESTION. IT IS FOR CLASSIFICATION PURPOSES ONLY.

- 15 Which of the following best describes the kind of water you most frequently drink in your household:
(READ LIST, ACCEPT MULTIPLE RESPONSES)

Water straight from the tap----- 13%
Filtered tap water ----- 52%
Individual water bottles bought at the grocery store----- 35%
Large containers of bottled water purchased from a
service and served through a dispenser----- 12%
(DON'T READ) Other ----- 0%
(DON'T READ) DK/NA ----- 1%

THANK AND TERMINATE

Gender (By observation)

Male----- 49%
Female ----- 51%

Phone # _____

Interviewer _____

Verified by _____

Service Start Date (see file) _____

Monthly Service Fee/Rate (see file) _____

TREATMENT METHOD ARGUMENTS HEARD FIRST

Q11 (Chloramines)-----50%

Q13 (GAC) -----50%

OWNER/RENTER

Owner -----90%

Renter -----10%

Attachment 5

Framework for Sustainable Communities

Using chloramines to meet a new drinking water standard for THMs

Action



	Ecology <i>How does it influence the Natural Environment?</i>	Economy <i>How does it directly influence the local economy and at what short and long term costs?</i>	Empowerment <i>How does it influence relationships, effective government, and social justice?</i>	Efficiency <i>How does it influence the delivery of infrastructure we provide?</i>	Health <i>How does it influence the well-being of people?</i>
Strengths	<ul style="list-style-type: none"> - Minor emissions of carbon dioxide from the manufacture and transport of chloramines 	<ul style="list-style-type: none"> - Customers water bills would increase by <10%. - Only minor modification to the system is needed to implement chloramines. 	<ul style="list-style-type: none"> - Continue to serve all customers equally including those in disadvantaged communities with affordable high-quality water 	<ul style="list-style-type: none"> - Very low levels of THMs are formed - Disinfectant last longer, helping prevent bacterial growth in pipelines. 	<ul style="list-style-type: none"> - Ensure full compliance with the new THM standard enforceable in 2012 - Improved taste and odor (No chlorine taste and odor)
Weaknesses	<ul style="list-style-type: none"> - Potential negative effects on fish and amphibians 	<ul style="list-style-type: none"> - No cost incentive for customers to conserve water 	<ul style="list-style-type: none"> - The majority favored GAC over chloramines in community meetings and in a customer survey. 	<ul style="list-style-type: none"> - Increase in monitoring and operation due to potential nitrification - Increase in frequency of filter replacement at kidney dialysis facilities 	<ul style="list-style-type: none"> - More chemicals added to water and risks associated with handling them - Potential lead & copper leaching and bacterial growth from nitrification
Opportunities	<ul style="list-style-type: none"> - Significantly lower impact on ground water basins as a result of very low THMs in treated surface water banked in aquifers 	<ul style="list-style-type: none"> - Provide affordable water rates to customers with low and fixed incomes 	<ul style="list-style-type: none"> - Can change customers' perception about use of chloramines with better messages and educational outreach 	<ul style="list-style-type: none"> - Many water utilities have used chloramines for decades, including Malibu and Val Verde. Knowledge and experience available to handle potential problems 	<ul style="list-style-type: none"> - Control of THMs concentrations to substantially below standard
Threats	<ul style="list-style-type: none"> - Small potential of nitrate in irrigation water to reach ground water 	<ul style="list-style-type: none"> - Future drinking water quality standards could require more upgrade to treatment plants, compared to use of GAC. 	<ul style="list-style-type: none"> - Can be used politically against the County. Need to clearly communicate with customers that water treatment is a technical decision, not a political one 	<ul style="list-style-type: none"> - Future drinking water quality standards could require more upgrade to treatment plants, compared to use of GAC. 	<ul style="list-style-type: none"> - Potential for other by-products that may be regulated in the future - May contribute to skin irritation and respiratory problems



Solution

Framework for Sustainable Communities

Using GAC to meet a new drinking water standard for THMs

Action



	Ecology <i>How does it influence the Natural Environment?</i>	Economy <i>How does it directly influence the local economy and at what short and long term costs?</i>	Empowerment <i>How does it influence relationships, effective government, and social justice?</i>	Efficiency <i>How does it influence the delivery of infrastructure we provide?</i>	Health <i>How does it influence the well-being of people?</i>
Strengths	<ul style="list-style-type: none"> - No potential ammonia discharges into surface and ground water 	<ul style="list-style-type: none"> - May create some local construction jobs to construct new facilities 	<ul style="list-style-type: none"> - The majority favored GAC in community meetings and in a customer survey. 	<ul style="list-style-type: none"> - Remove organic materials and, as a result, produces low levels of THMs, and, overall, better water quality 	<ul style="list-style-type: none"> - Less chemical addition to water - Improves taste and odor by reducing organic materials in water
Weaknesses	<ul style="list-style-type: none"> - Consume 120,000 mwh of power and generates 100,000 metric tons of carbon dioxide each year for manufacture and transport of GAC 	<ul style="list-style-type: none"> - Customer water bills would increase by ~50% - Requires extensive new facilities and ongoing O&M at estimates of \$70M and \$18M/yr, respectively 	<ul style="list-style-type: none"> - Over 45% of the meeting attendees were not Districts' customers - In the survey, about 50% customers changed their opinions. 	<ul style="list-style-type: none"> - Does not remove bromide, which also forms THMs - Frequent GAC replacement could impact treatment plant operations and production capacity. 	<ul style="list-style-type: none"> - Limited reduction of THMs - GAC operation can be challenging due to lack of experience and knowledge of its large-scale use
Opportunities	<ul style="list-style-type: none"> - Regeneration could be utilized to recycle GAC. 	<ul style="list-style-type: none"> - Water becomes more expensive and that may encourage water conservation. 	<ul style="list-style-type: none"> - Outreach to commercial and municipal customers since the survey was only conducted with residential customers 	<ul style="list-style-type: none"> - May help in complying with future drinking water quality regulations 	<ul style="list-style-type: none"> - GAC may remove other chemicals in water that may be regulated in the future
Threats	<ul style="list-style-type: none"> - Most GAC is currently imported. Future import tariffs on GAC may require more domestic production that would result in more CO2 generation in the US. 	<ul style="list-style-type: none"> - Water rate increases can be very difficult for some customers, particularly those with low and fixed incomes. 	<ul style="list-style-type: none"> - Feedback from the meetings and survey may not be fully credible due to lack of public understanding & awareness of the issue 	<ul style="list-style-type: none"> - May raise issues with water quality equity in other Waterworks Districts. 	<ul style="list-style-type: none"> - Building GAC facilities could require 3-3.5 years. New THMs' standard will be enforceable in 2012. There is a chance of standard violations.



Solution